RESEARCH ARTICLE

Bibliometric Analysis of Outpatient Hip and Knee Arthroplasty Research Evolution

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Received: 19 June 2024 *Accepted: 21 October 2024*

Abstract

Objectives: Total joint arthroplasty is an effective treatment for end stage osteoarthritis. As perioperative protocols are developed, outpatient arthroplasty has been gaining traction to facilitate earlier recovery and same day discharge. The aim of this manuscript is to analyze the trends in outpatient arthroplasty over a 17-year duration. This analysis seeks to predict emerging themes in the literature on patient optimization and outcomes in outpatient arthroplasty.

Methods: This study conducted a literature review on outpatient arthroplasty with the Web of Science Core Collection over a 17-year period between 2005 and 2022. Bibliometric data was imported and analyzed with Bibliometrix and VOSviewer.

Results: 198 articles were identified demonstrating an annual growth of 19.61% with notable bursts in 2017 and 2021. United States was the top global contributor followed by Canada and European nations. There were significant contributions across 219 institutions and 758 authors, with the Journal of Arthroplasty being the most productive and influential journals. Key themes identified include the feasibility of outpatient surgery, pain management, and perioperative complications and costs.

Conclusion: This bibliometric analysis highlights the ongoing growth and development within outpatient arthroplasty since 2005. The United States remain the global leader within outpatient related arthroplasty research. Previous, current, and ongoing trends are highlighted within this field for further development as hotspots.

Level of evidence: III

Keywords: Bibliometrics, Original article, Outpatient, Total hip arthroplasty, Total knee arthroplasty

Introduction

Total joint arthroplasty (TJA) is an effective intervention for improving physical function and alleviating pain in patients with end-stage osteoarthritis.[1–3] Arthroplasty is the definitive intervention for patients that failed conservative management. [4,5] Arthroplasty is a common procedure with substantial growth especially between 2000 and 2019 where total hip and knee arthroplasty increased 177% and 156%, respectively.[6] As the geriatric population continue to rise, the projected demand for these procedures will further increase with predictions of 71% and 85% growth in hip and knee replacements by 2030, and 28.84% and 24.28% by 2050.[7,8]

As arthroplasty techniques evolve with implant advancements, outpatient arthroplasty introduced development in perioperative protocols with the goals of decreased healthcare utilization. Despite the push towards outpatient procedures, patient selection is critical for optimal outcomes. However, a projected shift towards more outpatient surgeries is anticipated in the foreseeable future.[9]

Bibliometrics is a quantitative and qualitative analytic approach to identify relevant publications, contributing countries, journals, authors, institutions, keywords, global collaborations within an area of interest. Bibliometric analysis provides insight towards future hot spots to guide

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further research.[10] The aim of this manuscript is to analyze the trends in outpatient arthroplasty over a 17-year duration. This analysis seeks to predict emerging themes in the literature on patient optimization and outcomes in outpatient arthroplasty.

Materials and Methods

Sources of Data and Search Strategy

Web of Science Core Collection of Clarivate Analytics (WOS) is the most commonly used scientific information engine and was used for further bibliometric analysis. A query of the literature was conducted with the Science Citation Index Expanded and Social Science Citation index. The search terminology included "arthroplasty" or "replacement" (Topic) AND "hip" OR "knee" (Topic) AND 1992-2022 (Year Published) AND Article (Document Type) AND "outpatient" or "ambulatory" or "same day" OR "day of surgery discharge" (Topic). This query assessed between 1992-2022 with articles as the document type and indexed with SCI-EXPANDED and SSCI in an effort to minimize omissions. Search terms selected and assessed by highlighting keyword in outpatient arthroplasty literature.

Data Extraction

Two authors conducted the data collection process. Comprehensive information relevant to the analysis was gathered such as publication year, title, authors, affiliating institutions, countries of origin, and journals of publication, abstracts, citation counts, and impact factors.

Bibliometric Analysis

Bibliometric indicators from the WOS database were retrieved in excel format for subsequent analysis. Discrepancies or missing information in the dataset were addressed by cross referenced against the WOS database. Data from various location of interest were organized by respective countries. Visualization techniques, including knowledge maps of scientific output, co-authorship networks, co-citation analysis, trend analysis in topics, thematic maps, dual-map overlays, and thematic evolution, were employed using VOSviewer (version 1.6.19.0) (Leiden University, Leiden, Netherlands) and Bibliometrix (University of Naples Federico II, Naples, Italy).

Results

Publication Data

WOS database search identified 198 articles associating with outpatient arthroplasty major databases published between the years 2005-2022. Number of citations in major database were 4468 with an average of 22.57 citations per document. Figure 1 highlights global annual publication numbers and is notable for an increasing trend within major database with an annual growth rate of 19.61% [Figure 1]. The largest increase in publication output was in 2016 and 2020 with a difference of (20) followed by 2018 (6), and 2019 (6).

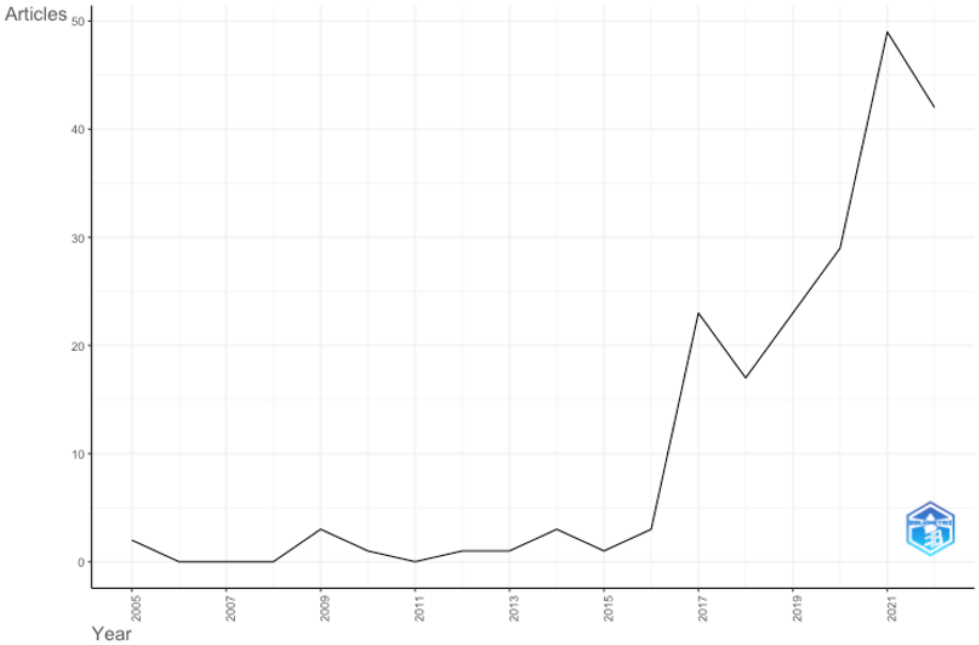

Figure 1. Trend in Annual Publication Volume for Outpatient Arthroplasty Research (2005–2022)

Countries

Table 1 illustrates the productivity of worldwide research. While the databases of interest were US-based registries, publications demonstrated origin in 17 countries with the US as the largest contributor (67.83%). Other countries following the United States include Canada (11.82%),

Denmark (8.32%), Netherlands (3.06%), France (2.41%), and United Kingdom (1.97%) [Table 1]. Figure 2a and figure 2b highlight that, among the included countries, United States had the greatest citations (3595) and ranked first in annual productivity [Figure 2a, Figure 2b].

Table.1 International Output of Outpatient Arthroplasty Research by Country

Region	Frequency
USA	310
Canada	54
Denmark	38
Netherlands	14
France	11
United Kingdom	9
Belgium	5
Chile	5
Switzerland	2
Turkey	2
Australia	1
Barbados	1
China	1
Germany	1
Italy	1
South Africa	1
Sweden	1

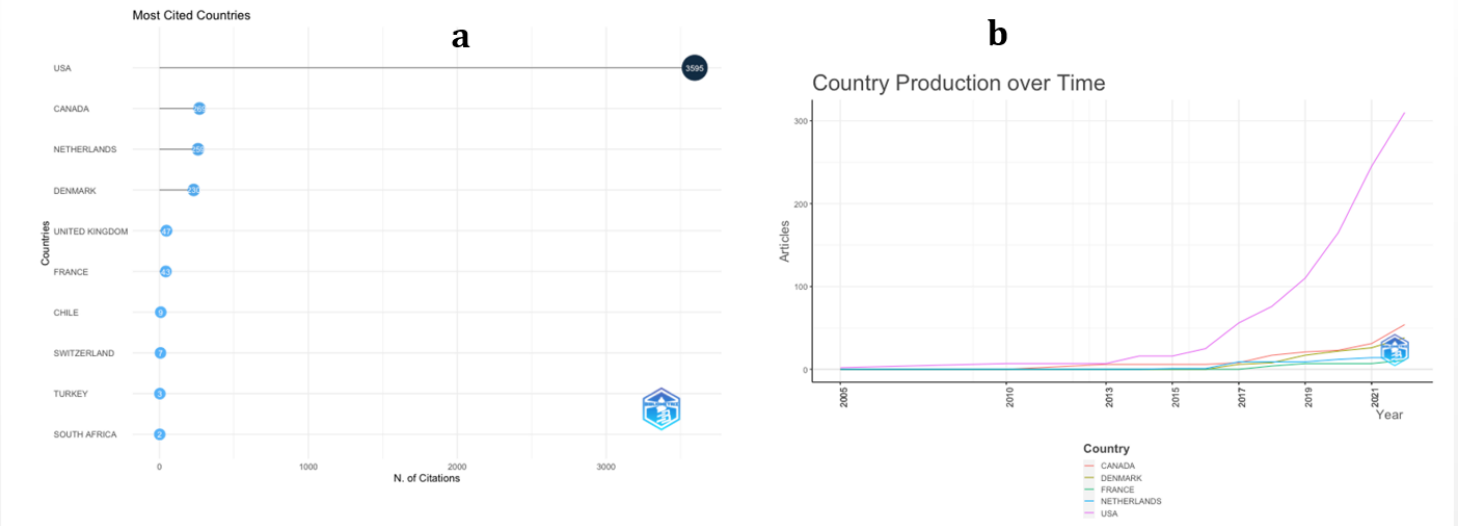

Figure 2. (2a) Distribution of Total Citations by Country for Outpatient Arthroplasty Research (2005–2022). (2b) Comparative Trends in Research Output by Country for Outpatient Arthroplasty Research (2005–2022)

Institutions/Authors

Outpatient arthroplasty research demonstrated 219 institutions with at least one published article. Figure 3a presents the top six institutions from Canada, the USA, and Denmark [Figure 3a]. The University of Toronto leads with 14 publications, followed by the Ottawa Hospital Research Institute and Rush University, each with 10, and Indiana University Bloomington with 9.

The greatest annual production was University of Toronto in 2022 with an absolute increase of 8 articles. The greatest

annual production for the other top 5 institutions were Rush University (2021 and 2022, 10), Ottawa Hospital Research Institute (2019-2022, 10), Indiana University Bloomington (2022, 9), and University of Tennessee Health Science Center (2021 and 2022, 9).

A total of 758 authors contributed to outpatient arthroplasty research. Among the top 10 most productive authors, 7 are from the US, and 3 from Denmark [Figure 3b]. The most productive authors include Kirill Gromov from Copenhagen University Hospital and Ran Schwarzkopf from NYU Hospital with 9 publications, and Michael Meneghini from Indiana Joint Replacement Institute with 8. Figure 3c reveals the most cited author as Richard A. Berger with 235 citations, followed by Thomas L. Sanders and Scott Sporer, each with 129 citations [Figure 3c]. The authors with the greatest impact by h-index are Kirill Gromov, Henrik Husted, and Michael Meneghini each with h-index of 6.

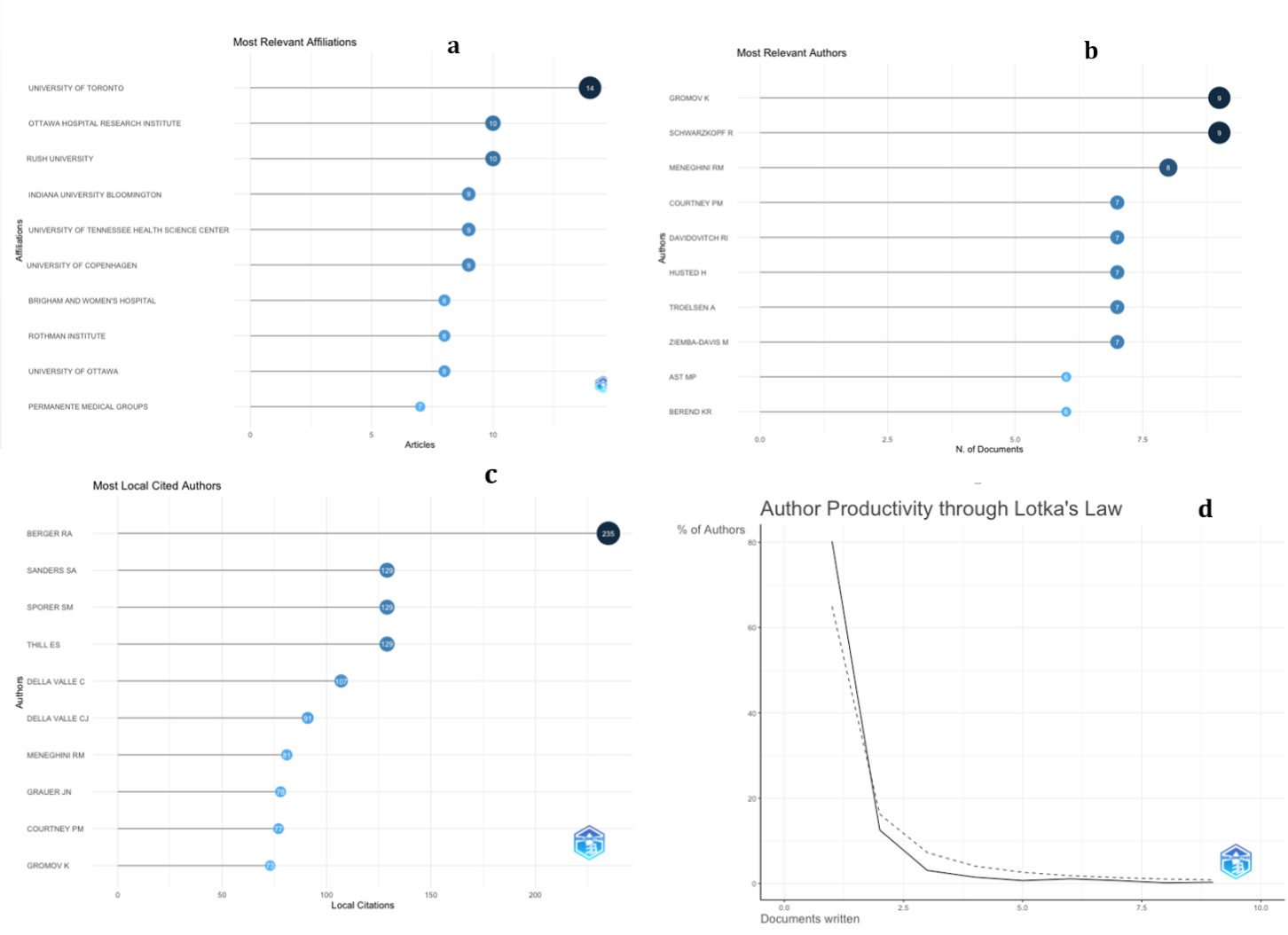

Figure 3. (3a) Cumulative Institution Contributions in Outpatient Arthroplasty Research Over Four Decades. (3b) Publication Output of Authors in the Field of Outpatient Arthroplasty Research Over 40 Years. (3c) most cited author in the field of Outpatient Arthroplasty Research over 40 years. (3d) Lotka's law diagram demonstrating the decreasing % of authors with increasing amounts of articles written.

Journals

49 journals published studies on outpatient arthroplasty between 1982 and 2022. The Journal of Arthroplasty led these publications in the number of articles, with 78, making it the most prominent among them [Figure 4]. Following closely were Acta Orthopedica and the Journal of the American Academy of Orthopedic Surgeons, with 11 and 7 articles, respectively. The greatest annual production from Journal of Arthroplasty was 2022 with 78 articles published. The year 2021 saw the highest number of publications from the Journal of Arthroplasty with 16 articles. Journal of Arthroplasty was the most cited with 1615 citations, followed by Clinical Orthopedics and Related Research with 510 citations, and the Journal of Bone and Joint Surgery with

398 citations. The most impactful journals by h-index were Journal of Arthroplasty (26), Acta Orthopedica (6), Bone & Joint Journal (6), Clinical Orthopedics and Related Research (6), Journal of Bone and Joint Surgery-American Volume (5), and Knee Surgery Sports Traumatology Arthroscopy (5).

Most Influential Articles

The article with the highest influence was published in 2014 with 191 citations.[11] "Complications, Mortality, and Costs for Outpatient and Short-Stay Total Knee Arthroplasty Patients in Comparison to Standard-Stay Patients" by Lovald et al. examined the differences in complications, costs, and mortality among patients undergoing total knee arthroplasty demonstrating cost savings with similar or reduced complications despite shorter length of stays.[11] The 2009 article "Newer Anesthesia and Rehabilitation Protocols Enable Outpatient Hip Replacement in Selected Patients" by Berger et al. followed after with 173 citations, demonstrating the effectiveness of modern anesthesia and rehabilitation protocols for patients to undergo outpatient hip replacements.[12] Berger et al.'s 2009 study titled "The Feasibility and Perioperative Complications of Outpatient Knee Arthroplasty" evaluated the feasibility of same-day discharge for knee arthroplasty patients and its associated risks with 172 citations.[13] The top 10 most cited articles are shown in [Figure 5].

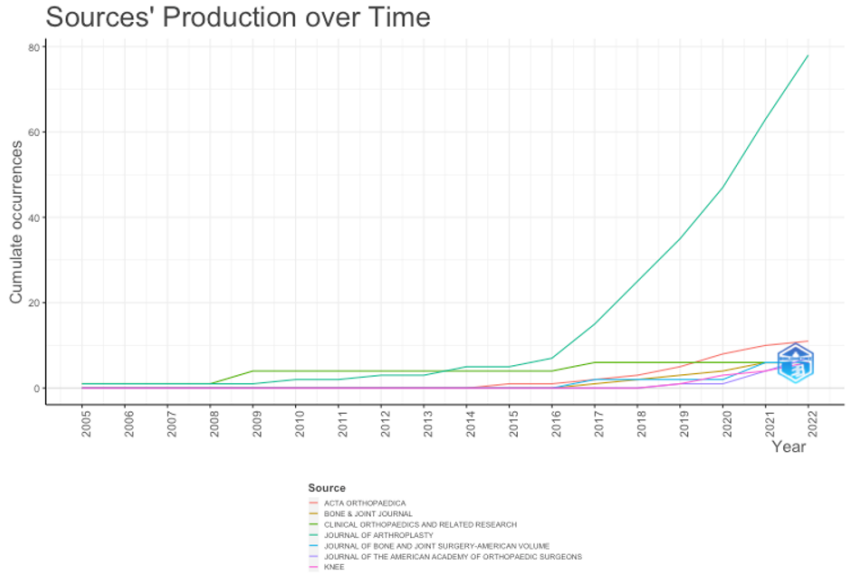

Figure 4. Cumulative Annual Publications in Key Journals on Outpatient Arthroplasty (2005–2022)

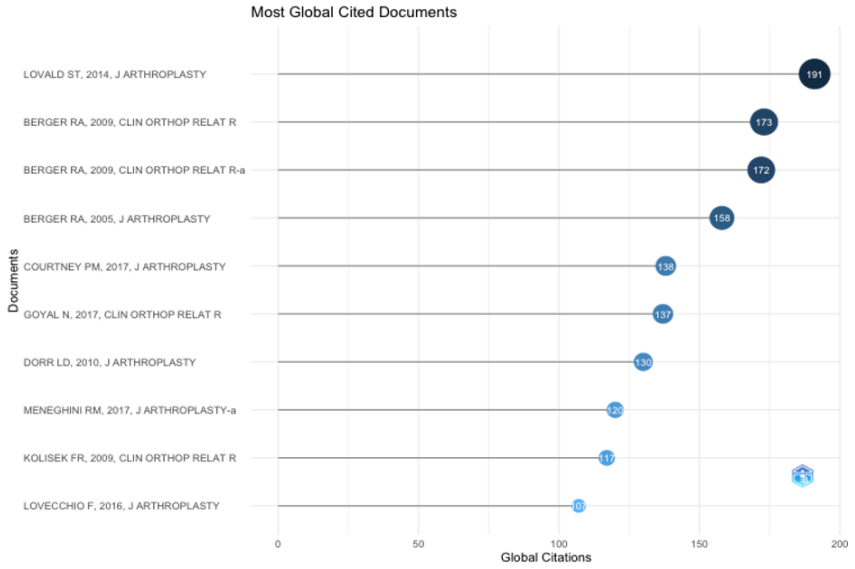

Figure 5. Leading Articles in Outpatient Arthroplasty Research Categorized by Citation Counts

Keywords

Figure 6 demonstrates the co-occurrence visualization and tree-map for keywords within outpatient arthroplasty research [Figure 6]. Of the 307 keywords, a total of 72 keywords occurred at least 3 times. Analysis demonstrates clusters as seen in Figure 6a with the size of the circle correlating to frequency of occurrence [Figure 6a]. Trend topics by time period is demonstrated in Figure 6b with recent traction towards complications and enhanced recovery [Figure 6b].

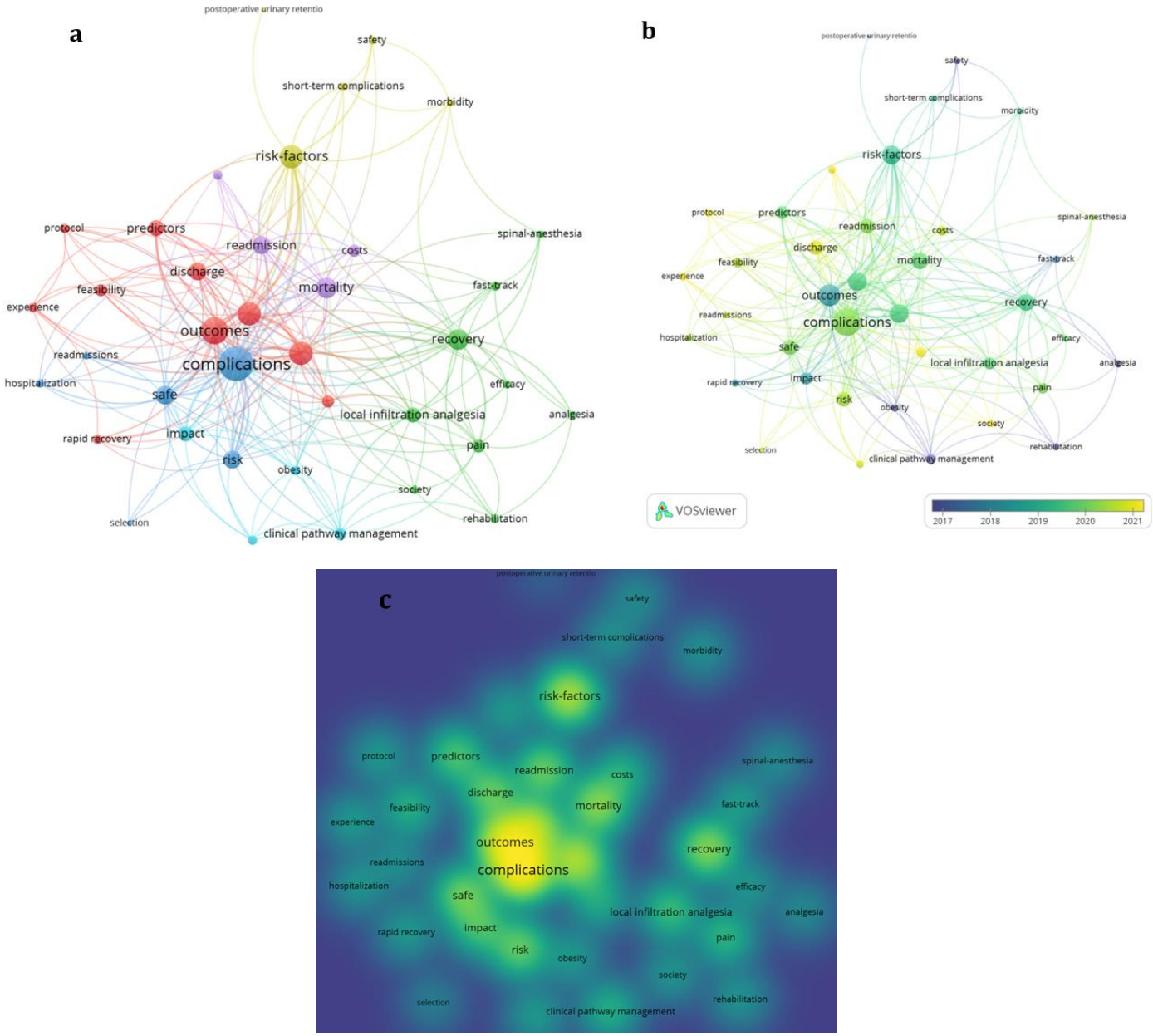

Figure 6. (6a) Keyword Co-occurrence Network with Threshold of 15 Occurrences for Cluster Identification. (6b) Temporal Keyword Co-occurrence Network Highlighting Evolution of Research Themes. (6c) Density Visualization of Keyword Clusters in Outpatient Arthroplasty Research

Discussion

This study conducted a bibliometric analysis to identify the current trends in outpatient arthroplasty research. The authors present productive countries, journals, authors, institutions, articles, and keywords with the goal of hot spot identification in the current academic literature.

Publication Production

The overall annual growth rate was 19.61%. The most

substantial year-over-year rises occurred between 2016 and 2017 and again between 2020 and 2021, each with an increment of 20 articles.

Countries

The United States stood out as the leading country in production of articles published, yearly productivity, and cumulative citations. It contributed to 72.17% of the total global article output with 3,595 citations in total. International collaboration was predominantly initiated by the United States, which participated in 55.5% of such cooperative efforts. The three foremost countries in terms of collaboration with the United States were Canada, Australia and Barbados, with 3, 1, and 1, respectively.

Institutions/Authors

Rush University and the Ottawa Hospital Research Institute was the most significant academic institutions for outpatient arthroplasty research. University of Toronto had the greatest annual production between 2021-2022. Kirill Gromov, from Copenhagen, stood out as the most relevant and influential author with 9 total publications and h-index of 6. Berger RA continues to be the most cited author with 235 citations. Figure 3d illustrates the combined productivity of authors, showcasing Lotka's Law, which shows a reduction in the number of authors as the number of articles written increases [Figure 3d]. Figure 7 presents a three-fields plot that displays the most prolific authors with their most frequently cited studies and the prevalent keywords found within those studies [Figure 7].

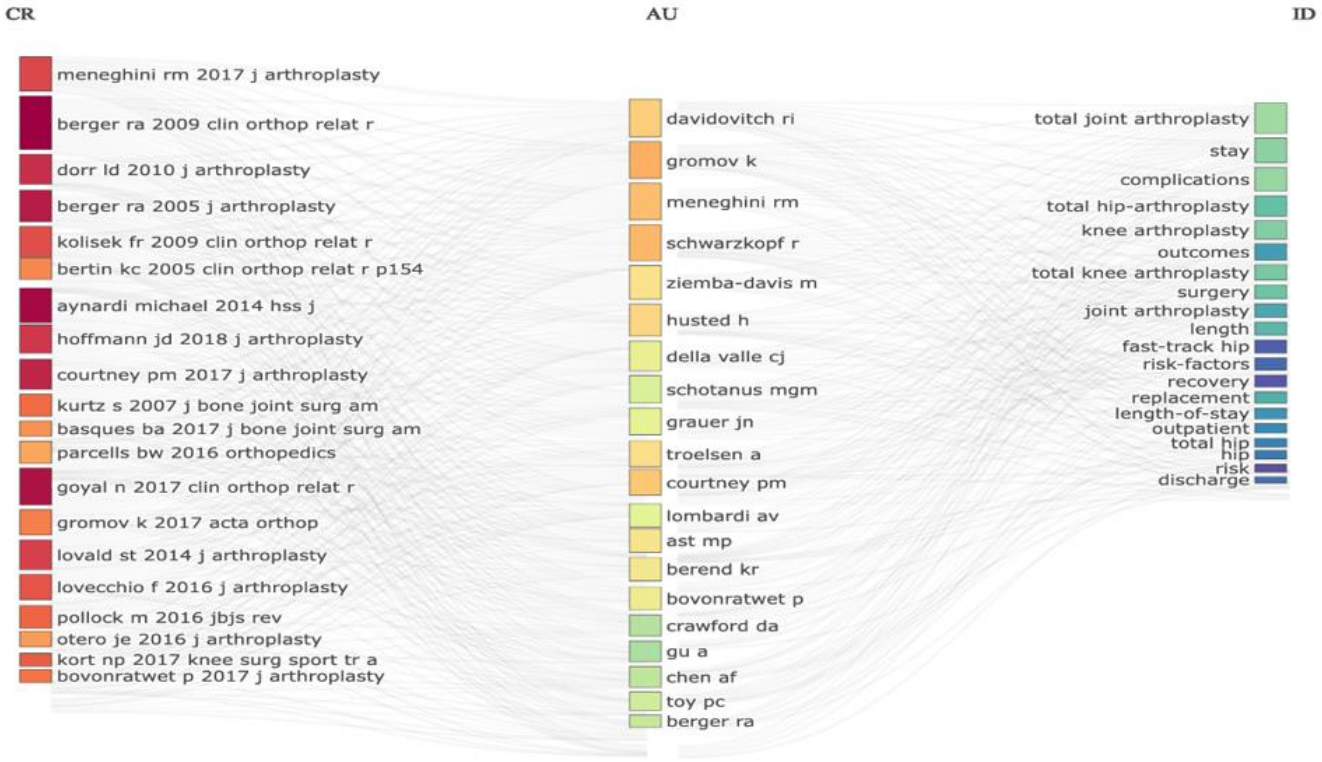

Figure 7. Tripartite Graph Showcasing Leading Authors, Their Highly Cited Publications, and Common Keywords in Outpatient Arthroplasty Research

Journals

The Journal of Arthroplasty demonstrated the largest number of published articles, h-index, and accumulated citations Acta Orthopaedica and the Journal of the American Academy of Orthopaedic Surgeons followed after with 11 and 7 articles, respectively.

Most Relevant Articles

Identification of the most relevant articles is essential for assessing trending topic hotspots for future research.[14] The most relevant articles include "Complications, mortality, and costs for outpatient and short-stay total knee arthroplasty patients in comparison to standard-stay patients" by Lovald et al., 2014[11]; "Newer anesthesia and rehabilitation protocols enable outpatient hip replacement in selected patients," by Berger et al., 2009[15]; and "The feasibility and perioperative complications of outpatient knee arthroplasty" by Berger et al., 2019.[13]

Keywords

The co-occurrence overlay visuals depicted in Figure 6a and the density map showcased in Figure 6c illustrate the clusters and their associated keywords [Figure 6a], [Figure 6c]. Keywords such as “outcomes," "mortality," and “complications” were frequently used aligning with the increasing emphasis on peri-operative optimization to mitigate risk factors through protocol development. The co-occurrence overlay in Figure 6b reveals clusters and their respective time periods [Figure 6b]. The important clusters gained emphasis in 2019-2020, with keywords like “outcomes”, “complications”, “mortality”, “readmission” and node linkage to “discharge” in 2021.

Clusters

Six clusters were identified through relevant keyword search with the cluster themes generally falling into the following categories: Feasibility of outpatient surgery, pain management, perioperative complications, pre-operative optimization, short term complications, and financial burden on stakeholders.

Feasibility of outpatient surgery

Feasibility of outpatient surgery cluster included keywords of discharge, experience, feasibility, outcomes, predictors, and protocol. Recent studies have focused on protocol development to allow enhanced recovery following arthroplasty, making outpatient surgery a more achievable process. Studies have demonstrated patients similar levels of satisfaction when participating in telemedicine health appointments compared to face-to-face visits.[16] The patients were predisposed to continue with virtual appointments due to convenience in time and economic savings.[16] Goeb et al. studied wrist-based activity trackers to monitor postoperative activity in total hip arthroplasty patients, and found a significant correlation between increased weekly steps and improved Hip Disability and Osteoarthritis Outcome Score-Junior, a measure of post-operative joint function and pain.[17] Technology advancement has enabled tracking and quantification of outpatient rehabilitation progress allowing for time-efficient, yet convenient follow-up visits[16,17] Quantification of the recovery process to a measurable variable may improve expectations for recovery. Identifying factors predictive of a patient’s satisfaction/dissatisfaction as well as methods to measure these qualitative measures has gained traction. In a study by Mueritzha et al., gender, residual pain, skin closure method, ROM, and ability to perform basic activities were correlated with patient satisfaction.[18] However, unmet patient satisfaction was correlated with increased dissatisfaction, which could be explained by sparse data of a clear objective recovery path for arthroplasty patients.[19] In order to make arthroplasty a more feasible procedure, studies suggest making follow-up time and cost efficient.[20,21] Additionally, novel methods to quantify post-operative recovery are needed to set recovery expectations to improve the feasibility of outpatient surgery.

Pain Management

Pain management cluster included keywords of analgesia, efficacy, fast-track, local infiltration analgesia, pain, recovery, rehabilitation, and spinal anesthesia. Adequate analgesia is critical to the immediate postoperative recovery process and positive outcomes during rehabilitation. However, patients may present with a history of preoperative narcotic therapy and pain catastrophe.[22] Nielson et al. demonstrated that a single IV dose of preoperative steroids (dexamethasone 1 mg/kg) led to significant pain reduction 24 hours after TKA with reduced C- reactive protein levels and quality of recovery.[22] Another study by Vitola et al. demonstrated the utility of different doses of intrathecal morphine evaluated by effect on postoperative pain intensity and notable side effects including post operative nausea and vomiting.[18] The study demonstrated that 0.2 mg morphine with bupivacaine had a superior analgesia advantage compared to 0.1 mg morphine with bupivacaine.[23] Despite the use of multi-modal pain regimens, opioids continue to be the primary analgesia medication following arthroplasty surgery, despite notable side effects of respiratory depression, postoperative nausea/vomiting, and pruritus.[24] The integration of novel technologies in clinical settings has shown that digital and technical tools positively impact pain management outcomes by informing patients about their pain progression.[25] Moreover, engaging patients effectively during the perioperative period could empower them to take an active and informed role in managing their treatment.[26] There is still a demand for analgesic management protocols and novel therapy regimens, despite the trend toward patient education throughout the recovery process with constant communication to improve patient outcomes.[27,28]

Perioperative Complications and Cost

The perioperative complications and cost cluster includes keywords such as complications, hospitalization, readmission, selection, safety, and risk. This cluster highlights that advancements in surgical techniques, implant designs, and appropriate complication reduction have significantly reduced the duration of hospital stays following arthroplasty procedures, from an average of 10 days in the early 1990s to just 2.2 days in recent reports.[29,30] The continual push towards shorter hospital stays coupled with the demands for decreasing healthcare resource utilization, positions outpatient arthroplasty as the next development.[31,32] Financial analyses illustrate that outpatient orthopedic surgeries, including total hip arthroplasty and total knee arthroplasty, can achieve cost reductions ranging from 17.5% to 57.6%, equating to net savings of $4,000 to $8,500 per procedure.[33] Nonetheless, the financial viability of outpatient arthroplasty must carefully consider the risk of complications such as periprosthetic joint infection and venous thromboembolism (VTE), which can cause a surge in morbidity and mortality, rendering outpatient arthroplasty programs economically unviable. Management of each of these complications is therefore essential:

The primary guidelines for VTE prophylaxis following arthroplasty are those from the American College of Chest Physicians (ACCP) and the American Academy of Orthopaedic Surgeons (AAOS).[34,35] The ACCP guidelines advocate for pharmacologic prophylaxis for total hip arthroplasty (THA) and total knee arthroplasty (TKA), recommending fondaparinux, dabigatran, rivaroxaban low molecular weight heparin, apixaban, vitamin K antagonists, unfractionated heparin, and aspirin for 10–14 days, up to 35 days. They specifically suggest low molecular weight heparin as the preferred option (grade 2C/2B recommendation). The AAOS guidelines also support pharmacologic prophylaxis for THA and TKA, provided there is no increased risk of bleeding, but do not specify particular medications. Prescription patterns differed between countries. In the USA and in Australia, the majority of THA and TKA cases received aspirin.[36,37] In Korea, between 2008 and 2012, the majority of THA and TKA patients received low molecular weight heparin while only 66-75% of the cases received pharmacologic prophylaxis between 2012-2013.[38-40]

Aspirin use has increased over the past years thanks to the increased evidence of its efficacy and safety.[41] Patients on aspirin had reduced risk of bruising and lower extremity oedema and similar risks of pulmonary embolism and deep vein and no difference in infection, mortality or bleeding[41]. Another study showed a reduced mortality rate due to cardiac-related causes.[42] Also, low dose (81 mg) and high dose (325 mg) aspirin had similar outcomes in both TKA and THA.[43,44]

As for infection prophylaxis, giving intraoperative IV antibiotics for 24 hours after surgery becomes unfeasible when patients are discharged from the hospital on the same day. Oral antibiotics' role in meeting AAHKS requirements is not well understood and is not routinely applied. While some outpatient TJA methods employ a single preoperative IV dosage, others administer oral antibiotics upon discharge.[45,46] There are currently no standards in place for the use of oral antibiotics following outpatient arthroplasty, which calls for greater research on the subject. This is in contrast to the well-studied use and procedures for postoperative IV antibiotics. Nonetheless, the infection rates from trials with a single preoperative IV dose—which complies with WHO and CDC recommendations—indicate that this strategy is probably sufficient.[45,46] When it came to oral antibiotics, cephalosporins accounted for the majority (74.3%), with cephalexin (52.8%) and cefadroxil (19.1%) being the most regularly prescribed. The most often administered non-cephalosporin antibiotics were doxycycline (6.2%), sulfamethoxazole-trimethoprim (6.7%), and clindamycin (6.8%). It is noteworthy that operations performed in ambulatory surgery centers had a notably higher probability of prophylaxis when compared to outpatient surgeries conducted in hospitals (OR 2.62, 95% CI 2.51 to 2.73, P <.001).[47,48]

If antibiotic prophylaxis fails, the resulting periprosthetic joint infection (PJI) is a serious complication that often requires surgical intervention along with intravenous antibiotic therapy for at least six weeks.[49] Surgical options include debridement and implant retention, which keeps metal implants in place while debriding the joint cavity and exchanging polyethylene liners.[50] This is standard for early PJI when the implant is stable, symptoms are under 3 weeks, no sinus tracts, and the pathogen responds to biofilm-active antibiotics.[50]

The one-stage exchange removes and replaces the entire prosthesis in a single operation. It's suitable for immunocompetent patients with few comorbidities and healthy soft tissues. The causative organism should be of low virulence, and antibiotic sensitivities must be known beforehand.[51]

In the two-stage exchange, the prosthesis is removed, an antibiotic-impregnated spacer is placed, and IV antibiotics are given for 2–8 weeks. A new prosthesis is implanted afterward. Patients must be able to undergo multiple surgeries and have sufficient bone stock.[51]

Salvage options are considered when surgery isn't feasible or has failed. Chronic suppressive antibiotic therapy may suit patients unable to undergo surgery—like those bedridden or with severe comorbidities—but it often doesn't eradicate the infection, requiring lifelong antibiotic use.[52,53]

When post-surgical joint function is expected to be poor or if the infection persists despite surgery, resection arthroplasty (removing the prosthesis without replacement) may be an option. This approach is typically used for elderly, non-ambulatory patients with high surgical risks or those for whom a prosthesis exchange would not improve function, as well as for individuals with inadequate bone stock, compromised soft tissues, recurrent infections, or a history of multiple failed revisions.[52]

In severe instances of knee prosthetic joint infection (PJI), where all conservative and surgical interventions are unsuccessful, or there is significant vascular damage or extensive loss of bone or soft tissue, an above-knee amputation might become necessary.[54]

Pre-operative risk reduction

Pre-operative risk reduction cluster included keywords of clinical pathway management, impact, obesity, and revision. Recent literature emphasizes risk factor optimization as a crucial strategy in arthroplasty to mitigate negative outcomes. The most important risk factor implicated as a predictor of arthroplasty outcomes is obesity.[55,56] Studies have demonstrated that obesity is a risk factor for increased risk of infection, fractures, and prosthetic dislocations with increased hospital readmission and cost.[57] Wall et al. demonstrated patient classification of Class-I and II obese (BMI between 30.00 and 39.99 kg/m^2) had an increased risk of all-cause revision and periprosthetic joint compared to those without obesity.[58] Additionally, Class-III obese patients (BMI ≥ 40.00 kg/m^2) exhibited increased risks of all-cause revision after one year, periprosthetic joint infection after three months, and revision for loosening compared to non-obese patients.[58]

The mechanisms behind these risks include the avascular nature of adipose tissue, which delays revascularization in damaged areas, resulting in inadequate oxygen and nutrient

delivery. Such conditions foster an oxidative environment that inhibits collagen production by fibroblasts, thus impeding proper wound healing.[59] Additionally, obesity-induced skin folds can prevent thorough sterilization of certain skin areas, increasing the risk of infection and complicating wound healing.[60] Furthermore, the chronic inflammatory environment increases the risk of blood clots when vessels are cut, further reducing blood flow and impairing wound healing.[61] These issues might be mitigated through weight loss, higher doses of LMWHs, PAI-1 inhibitors, and statins.[61] Downsey et al. have shown that bariatric surgery prior to arthroplasty leads to symptom reduction, pain relief, and improved post-operative results.[62] Further investigation into the assessment of preoperative bariatric surgery is required.

Short term complications and risk factors

Short term complications and risk factors cluster included keywords of morbidity, postoperative urinary retention, risk factors, and short-term complications. Postoperative urinary retention frequently occurs following total hip and knee arthroplasty.[63] To address this issue, the use of preventive routine indwelling catheters has been considered; however, it is linked with an increased risk of urinary tract infections.[64] In a study by Colin-Vasquez et al., use of a tourniquet significantly increases serum creatinine levels 48 hours after surgery, which increases the risk of acute kidney injury.[65] The authors warn tourniquets should be used with caution and avoided in individuals with chronic kidney disease.[65] The study further advocate for alternatives methodologies to achieve trans-surgical hemostasis to reduce incidents of acute kidney injury.[66] Postoperative wound complications are common especially when related to infection, hematoma, and necrosis.[67] There have been increasing interest towards suture material and techniques to attempt to minimize surgical time, while reducing the incidence of incisional complications. A study by Feng et al. attempted to demonstrate lower incidence rate of superficial wound complications with use of barbed suture compared to absorbable suture.[4] The study showed decreased operating times and no difference in incisional infection rate or incisional complications between barbed and absorbable sutures.[4]

Financial optimization for patient outcomes

Financial optimization for patient outcomes cluster included key words of bundled payments, costs, mortality, and readmission. The Comprehensive Care for Joint Replacement Model is an initiative in 2016 by Center for Medicare and Medicaid to bundle total joint arthroplasty procedures in efforts to provide cost effective care.[68] A Study by Zomar et al. demonstrated cost savings for outpatient total hip arthroplasty compared to inpatient equivalent from a health care payer and societal perspective.[69] Additionally, patient perception of postoperative satisfaction influenced costs as observed in Marsh J. et al.'s study that highlighted dissatisfied patients with pain and function incurred greater cost.[19] This was a result of higher indirect costs such as time lost from employment and further resource demand from the healthcare system.[19] Bundled treatment initiatives achieve cost savings through reimbursement of all patient care into one payment to promote quality care delivery. This model has not only demonstrated economic benefits, but also improved postoperative outcomes, such as preventable hospitalizations and total expenditures.[70] These savings are crucial as they reflect the broader implications of effective care beyond the direct medical expenses.[71]

Conclusion

This bibliometric analysis illustrates the growth in outpatient arthroplasty research, reflecting an ongoing shift in surgical practice towards outpatient settings. With the United States as the leading country on enhanced recovery protocols and cost management. Key publications reveal a concentrated interest in postoperative outcomes, feasibility of outpatient procedures, and pain management strategies. The emergent research themes regarding perioperative care and economic impact highlight areas for further studies. As the postoperative management of patients gains prevalence, future studies may be focused on long-term outcomes and patient optimization patient. This bibliometric study identified developed, current, and developing trends within outpatient arthroplasty with the goals of hotspot prediction to further improve patient care.

Acknowledgement

N/A

Authors Contribution: Authors who conceived and designed the analysis: Mouhanad M El-Othmani/Authors who collected the data: Fong H Nham, Marc Boutros/Authors who contributed data or analysis tools: Maroun Aoun, Mohammad Daher/Authors who performed the analysis: Eliana Kassis, Maroun Aoun/Authors who wrote the paper: Marc Boutros, Matthew P. Corsi, Jhonny Lopez

Declaration of Conflict of Interest: The author(s) do NOT have any potential conflicts of interest for this manuscript.

Declaration of Funding: The author(s) received NO financial support for the preparation, research, authorship, and publication of this manuscript.

Declaration of Ethical Approval for Study: N/A

Declaration of Informed Consent: N/A

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