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Chronic Otitis Media: Evaluations of Recent Approaches and Effects On Biological Systems by Means of Bibliometric Analyses

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ABSTRACT

Chronic Otitis Media (COM) is a health condition characterized by long-term infection and inflammation in the middle ear. Commonly seen in children, this condition can lead to severe hearing loss and intracranial complications (such as brain abscess, meningitis, etc.). Antibiotics form the first line of treatment, while surgical intervention may be required in resistant cases. Surgical treatment is effective in clearing infected foci and preventing complications. Recent bibliometric analyses indicate an increase in academic publications related to COM, particularly since the 2000s, with research from various disciplines broadening the perspective on the topic. The annual distribution of publications has gained further momentum since 2020, likely due to increased interest during the pandemic. In bibliometric analysis, the most cited studies focus on pediatric surgery and treatment outcomes, examining the reliability of surgical interventions and pathological processes. Keyword co-occurrence analysis plays a crucial role in identifying thematic structures within the research field. In conclusion, COM research requires more multidisciplinary collaboration, and public awareness on this issue should be increased. Bibliometric analyses provide valuable contributions to advancing knowledge in this field and guiding clinical practices. These analyses will help pave the way for new developments in understanding the causes, effects, and treatments of chronic otitis media.

Keywords: Chronic otitis media, Bibliometric analysis, Keyword co-occurrence, Thematic clustering, Auditory complications.

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Introduction

Chronic otitis media (COM) is a significant and persistent otologic health issue, characterized by long-standing infection and inflammation in the middle ear, often leading to progressive and irreversible hearing impairment, as well as potentially life-threatening intracranial and extracranial complications. This condition, frequently observed in pediatric populations, poses a substantial burden on public health systems, particularly in low- and middle-income countries where early diagnosis and effective treatment may be limited [1-3].

In recent years, bibliometric analyses of scientific studies focusing on the complications and treatment strategies of COM have provided valuable insights into the evolution of research trends, the diversity of therapeutic approaches, and the recurring clinical challenges encountered in managing the disease. These analyses not only map the intellectual structure of the field but also identify emerging research hotspots and collaboration networks among scholars and institutions [4,5].

COM is especially common in children and can cause serious intracranial and extracranial complications such as hearing loss, brain abscess, meningitis, perisinus abscess, and epidural abscess [6–10]. These complications arise primarily in cases where diagnosis and treatment are delayed, where infections are caused by multidrug-resistant (MDR) organisms, or where patients present with immunocompromised states [4,8,11]. Notably, pediatric patients with untreated or poorly managed COM are at higher risk for neurological sequelae, including cognitive delays related to prolonged hearing loss [12,13].

The most frequently isolated pathogens in COM cases are Pseudomonas aeruginosa and Staphylococcus aureus. The increasing prevalence of antibiotic resistance among these microorganisms poses a substantial obstacle to effective medical treatment and underscores the urgent need for antimicrobial stewardship in otolaryngological practice [7,9,11,14]. Inadequate antibiotic response often necessitates a transition from conservative to invasive interventions [15].

Antibiotics constitute the first-line treatment for COM, particularly in cases that present without severe complications. However, in situations involving antibiotic-resistant bacteria or anatomical damage, surgical procedures such as mastoidectomy or tympanoplasty become indispensable therapeutic options [11,14,16]. These surgeries aim to eradicate infection foci, reconstruct middle ear structures, and preserve or restore auditory function [17,18]. Among patients with intracranial involvement, emergency surgical management in conjunction with targeted antibiotic therapy is regarded as the standard of care to reduce morbidity and mortality [4,6,10,16].

Microbiological analyses, including bacterial culture and antibiotic susceptibility testing, play a critical role in tailoring individualized treatment protocols, thereby enhancing therapeutic efficacy. Moreover, increasing public awareness about the signs and risks of COM is essential for promoting early diagnosis, timely referral to specialists, and adherence to treatment regimens, particularly in vulnerable pediatric and rural populations. Recent literature not only reaffirms the importance of accurate diagnosis and evidence-based treatment selection but also calls attention to the pressing need for innovative solutions to manage antibiotic resistance, reduce postoperative complications, and optimize long-term patient outcomes [19]. Advances in molecular diagnostics and biofilm-targeted therapies have shown promise in improving prognosis in recalcitrant cases. Bibliometric analyses further highlight the global disease burden of COM, with disproportionately high prevalence rates reported in developing regions, where health inequalities and infrastructure gaps often hinder early intervention strategies [7,9-11]. These analyses provide a macroscopic view of the research landscape and reinforce the necessity of international collaboration and policy-level interventions to improve clinical care.

In conclusion, studies focusing on the complications and therapeutic modalities of chronic otitis media consistently demonstrate that early diagnosis, rational antibiotic use, and surgical management, when indicated, are critical components in mitigating the adverse consequences of this disease. Furthermore, bibliometric research significantly contributes to the consolidation of knowledge, the identification of research priorities, and the refinement of clinical practices in the field of otology.

Methodology

Bibliometric analysis is a systematic research method designed to quantitatively investigate the structural properties, developmental trends, and patterns of knowledge production and dissemination within scientific literature [20-22]. In this study, a comprehensive bibliometric analysis was conducted to evaluate the current state of academic research on *Chronic Otitis Media* (COM), with the aim of identifying leading authors, influential publication sources, and emerging thematic trends within the field.

The analytical process was structured in accordance with standard protocols commonly adopted in bibliometric research. The core research question guiding the study was defined as follows: "What is the quantitative distribution, thematic clustering, and structural interrelationship of scholarly publications on *Chronic Otitis Media*?" In line with this objective, the literature was systematically reviewed.

The *Web of Science* (WoS) database was selected as the primary data source due to its comprehensive indexing of high-impact journals in the health sciences, particularly in otolaryngology and clinical research domains [23]. The data collection strategy involved a search of the WoS Core Collection using the keyword phrase "Chronic Otitis Media," restricted to the title field. The search excluded publications from the year 2025, included only records classified as "articles," and was limited to English-language publications. As a result, a total of 1,039 articles were included in the analysis.

The retrieved bibliographic records were exported to a reference management system for data organization. Duplicate records were removed, and essential variables such as author names, publication years, journal titles, citation counts, keywords, and institutional affiliations were extracted for analysis.

For data visualization and network mapping, the software tool VOSviewer was employed. This tool facilitated the creation of visual maps representing co-authorship networks, keyword co-occurrence relationships, and inter-publication citation linkages, thereby enabling a detailed exploration of the structural and thematic composition of the COM research field [24].

In the final stage of the analysis, the findings were interpreted to reveal prevailing research trends, thematic gaps, and potential areas for future inquiry. Accordingly, this bibliometric study not only provides a quantitative cartography of the *Chronic Otitis Media* literature but also offers strategic insights that may guide subsequent scientific endeavors in the field.

Results

This section presents the findings of the bibliometric analysis conducted on the literature concerning *Chronic Otitis Media* (COM). The primary objective of the study is to investigate the quantitative dimensions of academic production in this clinical domain, reveal trends and structural characteristics within the literature, identify thematic clusters, and highlight research priorities. The results are systematically evaluated under subheadings such as publication trends by year, most highly cited articles, keyword analyses, and network visualizations.

Data collection was carried out through the Web of Science (WoS) database using the keyword "Chronic Otitis Media," limited to the title field. The search excluded records from the year 2025, focused solely on publications categorized as articles, and included only those written in English. Within this scope, a total of 1,039 articles were included for analysis. This dataset provides a valuable basis for examining the temporal evolution of academic research on COM.

The distribution of publications across years is critical for understanding the dynamics of scholarly interest in COM and evaluating the developmental trajectory of the literature. According to the data illustrated in Figure 1, the publication output between 1970 and 2024 was examined.

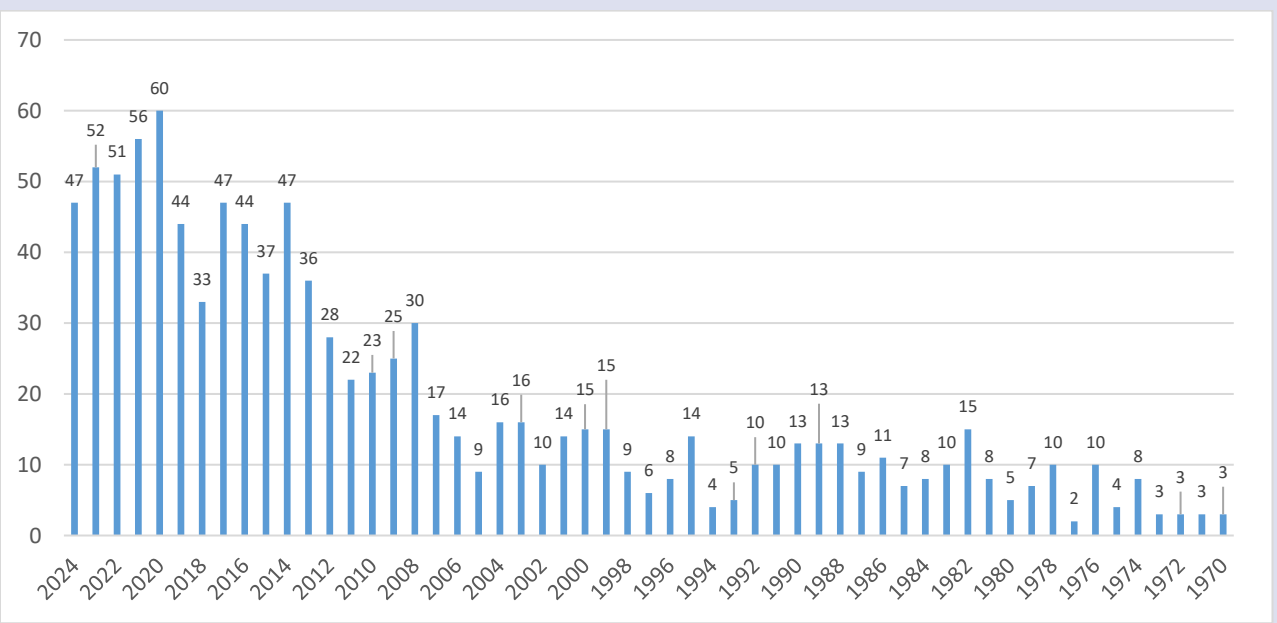

Figure 1. Annual distribution of publications on Chronic Otitis Media (1970–2024)

The earliest publications in the dataset appeared during the 1970s, a period characterized by limited academic attention to the topic. During the 1970s and 1980s, the annual number of publications ranged from approximately 2 to 10 articles per year. This modest volume suggests that COM research in its early stages was largely based on clinical observations and preliminary diagnostic frameworks.

A slight increase in publication frequency was observed in the 1990s, though the growth remained relatively moderate. The early 2000s, however, marked a turning point, with noticeable expansion in the literature—particularly in areas such as imaging technologies, surgical interventions, and antibiotic treatment strategies. From 2008 onwards, the number of publications began to follow a more consistent upward trajectory.

By the 2010s, COM began to be addressed not only as a clinical condition but also as a multidimensional issue encompassing public health, pediatric infections, and hearing loss. During this period, annual publication numbers consistently exceeded 30. A significant increase in scholarly output was recorded after 2020, with 60, 56, and 52 articles published in 2020, 2021, and 2023 respectively. This surge likely reflects the broader scientific interest in infectious diseases catalyzed by the COVID-19 pandemic. With 47 publications recorded in 2024, the momentum of academic production has been largely sustained.

The time-series data confirm the historical trajectory of scholarly interest in COM. The consistent rise in publications over the past 15 years demonstrates that COM remains a growing area of scientific inquiry, likely to attract further multidisciplinary attention in the future.

Subsequently, the analysis identified the ten most highly cited publications on COM indexed in the Web of Science database. These articles are presented in Table 1.

In the bibliometric analysis, the most highly cited publication was the study conducted by Hall-Stoodley et al. [25], which provided direct evidence of bacterial biofilms on the middle-ear mucosa of pediatric patients with chronic otitis media. Published in *JAMA*, this study has received 698 citations and has had a substantial impact on the field by underscoring the clinical relevance of biofilm formation in the pathogenesis of COM. The findings have contributed significantly to the evolving understanding of microbial persistence and antibiotic resistance in chronic middle-ear infections.

The second most cited article, by Gates et al. [26], is a randomized controlled trial evaluating the effectiveness of adenoidectomy and tympanostomy tube insertion in the treatment of chronic otitis media with effusion. Published in the *New England Journal of Medicine*, this study has garnered 261 citations and established the role of pediatric surgical interventions as a cornerstone in the management of COM with effusion.

Ranked third is the retrospective study by Osma et al. [27], which analyzed 93 cases of COM-related complications in Turkey. With 163 citations, this study is particularly notable for highlighting the morbidity and mortality risks associated with advanced-stage COM, offering critical insights into the consequences of delayed or inadequate treatment.

Subsequent highly cited works include those by Maw [28] and Zinkus et al. [29]. Maw's [28] research focuses on the long-term outcomes of surgical interventions such as adenotonsillectomy, while Zinkus [29] and colleagues examine the developmental and psychoeducational sequelae of chronic otitis media in children. Both studies are foundational contributions that underscore the intersection between clinical outcomes and pediatric development, emphasizing the long-term implications of recurrent middle-ear infections in early childhood.

Table 1. Top 10 Most Cited Publications in the Chronic Otitis Media Literature

Rank	Author(s)	Publication Title	Journal	Citations
1	Hall-Stoodley, L. et al. (2006)	Direct detection of bacterial biofilms on the middle-ear mucosa of children with chronic otitis media	*JAMA*	698
2	Gates, G. A. et al. (1987)	Effectiveness of adenoidectomy and tympanostomy tubes in the treatment of chronic otitis media with effusion	*New England Journal of Medicine*	261
3	Osma, U. et al. (2000)	The complications of chronic otitis media: report of 93 cases	*Journal of Laryngology and Otology*	163
4	Maw, A. R. (1983)	Chronic otitis media with effusion and adenotonsillectomy: prospective randomized controlled study	*BMJ*	134
5	Zinkus, P. W. et al. (1978)	Developmental and psychoeducational sequelae of chronic otitis media	*American Journal of Diseases of Children*	111
6	Nadol, J. B. et al. (2000)	Outcomes assessment for chronic otitis media: The Chronic Ear Survey	*Laryngoscope*	105
7	Mandel, E. M. et al. (1992)	Efficacy of myringotomy with and without tympanostomy tubes for chronic otitis media with effusion	*Pediatric Infectious Disease Journal*	103
8	Brook, I. & Finegold, S. M. (1979)	Bacteriology of chronic otitis media	*JAMA*	103
9	Riding, K. H. et al. (1978)	Microbiology of recurrent and chronic otitis media with effusion	*Journal of Pediatrics*	102
10	DeMaria, T. F. et al. (1984)	Endotoxin in middle-ear effusions from patients with chronic otitis media with effusion	*Journal of Clinical Microbiology*	100
11	Meyerhoff, W. L., Kim, C. S.,& Paparella, M. M. (1978)	Pathology of chronic otitis media	*Annals of Otology, Rhinology & Laryngology*	97
12	Mandel, E. M., Rockette, H. E., Bluestone, C. D., Paradise, J. L., & Nozza, R. J. (1989)	Myringotomy with and without tympanostomy tubes for chronic otitis media with effusion	*Archives of Otolaryngology–Head & Neck Surgery*	96
13	Zinkus, P. W., & Gottlieb, M. I. (1980)	Patterns of perceptual and academic deficits related to early chronic otitis media	*Pediatrics*	90
14	Brook, I. (2008)	The role of anaerobic bacteria in chronic suppurative otitis media in children: Implications for medical therapy	*Anaerobe*	90
15	English, G. M., Northern, J. L., & Fria, T. J.	Chronic otitis media as a cause of sensorineural hearing loss	*Archives of otolaryngology*	89
16	Gates, G. A., Avery, C. A., & Prihoda, T. J. (1988)	Effect of adenoidectomy upon children with chronic otitis media with effusion	*The laryngoscope*	88
17	Smith, J. A., & Danner, C. J. (2006)	Complications of chronic otitis media and cholesteatoma	*Otolaryngologic Clinics of North America*	86
18	Costa, S. S. D., Rosito, L. P. S., & Dornelles, C. (2009)	Sensorineural hearing loss in patients with chronic otitis media	*European Archives of Oto-Rhino-Laryngology*	84
19	Alles, R., Parikh, A., Hawk, L., Darby, Y., Romero, J. N., & Scadding, G. (2001)	The prevalence of atopic disorders in children with chronic otitis media with effusion	*Pediatric allergy and immunology*	79
20	Phillips, J. S., Haggard, M., & Yung, M. (2014)	A new health-related quality of life measure for active chronic otitis media (COMQ-12): development and initial validation.	*Otology & Neurotology*	77

Other top-cited articles in the list cover a broad range of topics, from diagnostic and therapeutic approaches to microbiological assessments. Among these, the work by Nadol et al. [30] stands out with the development of the *Chronic Ear Survey*, a validated patient-reported outcome measure designed to assess ear-specific health status in individuals with COM. This tool has become integral to

evaluating treatment efficacy from the patient's perspective.

Overall, the most cited studies are predominantly focused on pediatric populations and often reflect multidisciplinary approaches combining surgical, microbiological, and developmental perspectives. This trend suggests that chronic otitis media is not only a concern within otolaryngology but also a significant topic of inquiry in pediatrics, microbiology, and public health policy. The sustained academic interest in these areas reinforces the complex, multifactorial nature of COM and the need for integrated research strategies.

To further explore the conceptual structure of the literature, a keyword co-occurrence analysis was conducted. The resulting visualization highlights the prominent thematic relationships within the COM research domain. Such analyses are instrumental in identifying underlying research subfields, classifying focal areas, and structurally mapping the flow of scientific knowledge in the field.

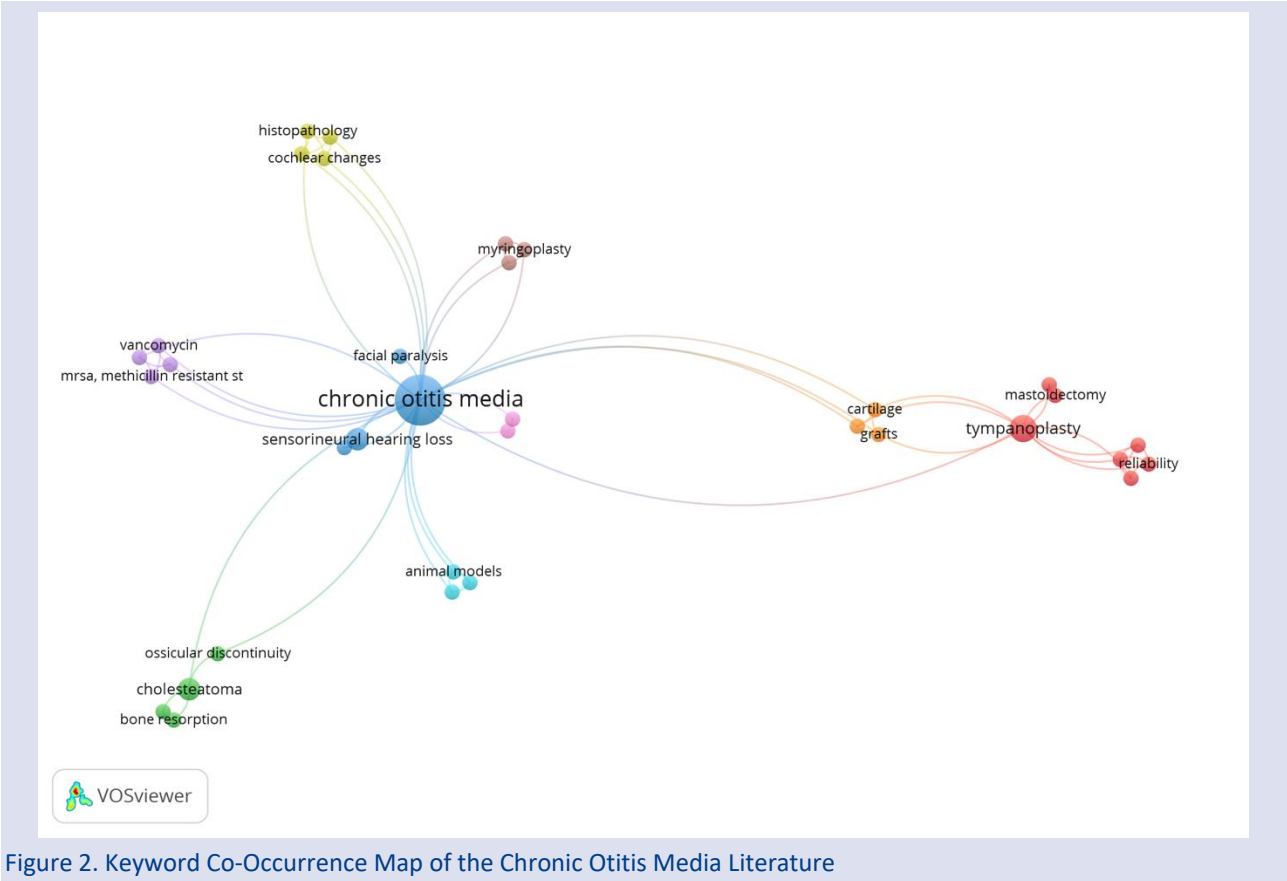

Figure 2. Keyword Co-Occurrence Map of the Chronic Otitis Media Literature

The visual map derived from the keyword co-occurrence analysis illustrates the conceptual diversity and thematic concentrations within the literature on *Chronic Otitis Media* (COM). At the center of the map lies the core keyword "chronic otitis media," from which various thematic clusters radiate in multiple directions. These clusters are color-coded to represent distinct subtopics that have emerged as dominant areas of research focus in the literature.

On the right side of the visualization, the red-colored cluster comprises keywords such as "tympanoplasty," "mastoidectomy," and "reliability," signifying a thematic concentration on surgical interventions and the assessment of their clinical effectiveness. This cluster occupies a central position in the network due to its relevance to treatment outcomes and procedural reliability in COM management. Adjacent to this, a smaller, orange-toned cluster featuring the terms "cartilage" and "grafts" reflects literature addressing reconstructive surgical techniques and graft materials used in otologic procedures.

On the left side of the map, a green cluster emerges, which is primarily composed of keywords such as "cholesteatoma," "ossicular discontinuity," and "bone resorption." These terms indicate a focus on the advanced pathological stages of COM, particularly the structural damage associated with ossicular chain disruption and bone erosion. These complications are critical considerations in surgical decision-making and treatment planning.

In the upper section of the map, a yellow-colored cluster is defined by terms such as "histopathology" and "cochlear changes," representing studies that investigate microscopic alterations in the middle and inner ear tissues. Closer to the center, a blue cluster includes terms like "sensorineural hearing loss" and "facial paralysis," emphasizing auditory and neurological complications of COM. These keywords highlight the disease's potential to

affect adjacent anatomical structures, thus broadening the scope of investigation beyond the middle ear.

Additionally, a light blue cluster focused on “animal models” indicates the presence of experimental research employing in vivo models to elucidate the pathophysiological mechanisms of COM under laboratory conditions. A smaller, purple-toned cluster centers on pharmacological approaches, particularly antimicrobial resistance, as represented by keywords such as “vancomycin” and “methicillin-resistant Staphylococcus (MRSA).” Finally, a brown-colored cluster surrounding the keyword “myringoplasty” denotes alternative surgical techniques distinct from tympanoplasty, often used in specific clinical contexts or pediatric populations.

Overall, the keyword co-occurrence map demonstrates that COM research is structured across multiple dimensions, including surgical treatment, complication management, pathological progression, and therapeutic strategies. The conceptual clustering within the visualization clearly reflects the interdisciplinary nature of the field and the continued intensity of both clinical and experimental research efforts.

Following the insights drawn from the keyword co-occurrence map, the thematic clusters identified in the literature have been systematically categorized. Each cluster represents a distinct research focus. The table below provides a comprehensive summary of these clusters, organized by thematic domain and highlighting prominent keywords associated with each.

Table 2. Thematic Clustering and Keyword Representation in Chronic Otitis Media Literature

Thematic Cluster	Prominent Keywords	Description
Surgical Interventions and Clinical Reliability	Tympanoplasty, Mastoidectomy, Reliability	This cluster comprises studies focusing on the surgical management of chronic otitis media, particularly evaluating the effectiveness and outcome reliability of procedures such as tympanoplasty and mastoidectomy.
Grafts and Reconstructive Surgical Techniques	Cartilage, Grafts	This group highlights research on graft materials used in otologic surgery—especially cartilage—and assesses the anatomical success and auditory outcomes of various reconstructive techniques.
Pathological Processes and Structural Degeneration	Cholesteatoma, Ossicular Discontinuity, Bone Resorption	Studies in this cluster address destructive anatomical changes observed in advanced stages of the disease, including ossicular chain disruption and bone erosion, with a focus on their underlying pathophysiology.
Histopathology and Cochlear Effects	Histopathology, Cochlear Changes	This theme centers on microscopic alterations in the middle ear and secondary effects in cochlear structures, with histopathological findings used to evaluate the systemic consequences of COM.
Auditory and Neurological Complications	Sensorineural Hearing Loss, Facial Paralysis	This cluster includes research addressing late-stage complications such as nerve damage and hearing loss, highlighting neurological sequelae and functional impairments associated with COM.
Experimental Research and Animal Models	Animal Models	This group consists of experimental studies employing animal models to explore the pathophysiological mechanisms of COM, particularly in preclinical laboratory settings.
Antibiotic Resistance and Microbiology	Vancomycin, MRSA *(Methicillin-Resistant Staphylococcus aureus)*	This cluster encompasses literature focused on antimicrobial resistance, microbial strains, and treatment responses, offering detailed insight into the microbiological dimensions of chronic infections.
Alternative Surgical Techniques	Myringoplasty	This theme represents research evaluating less invasive surgical procedures beyond tympanoplasty, often applied in pediatric populations, and discusses their clinical effectiveness.

The keyword co-occurrence clusters presented in Table 2 reveal the thematically concentrated areas of research within the *Chronic Otitis Media* (COM) literature. These clusters, identified through VOSviewer software, categorize the principal research focuses in the field into eight thematic groups. The first cluster encompasses studies related to surgical interventions and the reliability of these procedures. Centered around keywords such as “tympanoplasty,” “mastoidectomy,” and “reliability,” this cluster reflects the body of literature that evaluates the success and outcome reliability of commonly employed surgical techniques in the treatment of COM.

The second cluster focuses on graft materials used in otologic surgery. Defined by keywords such as “cartilage” and “grafts,” this group represents literature that examines the role of various tissue types in surgical success. Closely related to the first cluster, it reflects a sub-specialized focus on reconstructive techniques within surgical practice.

The third thematic cluster addresses the pathological changes observed in the advanced stages of COM. Terms such as “cholesteatoma,” “ossicular discontinuity,” and “bone resorption” point to structural damage in the middle ear and disruptions in auditory transmission. This group highlights the pathophysiological processes underlying destructive anatomical changes in the disease’s progression.

The fourth cluster encompasses studies investigating tissue-level changes in the middle and inner ear. Keywords such as “histopathology” and “cochlear changes”

characterize this group, which addresses the histological dimensions of COM and assesses its systemic effects based on microscopic alterations.

The fifth cluster focuses on the auditory and neurological complications of COM. Keywords like "sensorineural hearing loss" and "facial paralysis" signal interdisciplinary investigations into the disease's secondary effects, including nerve damage and functional impairments that arise during later stages.

The sixth thematic cluster represents experimental studies involving animal models. Denoted by the term "animal models," this group includes laboratory-based research aimed at elucidating the pathophysiological mechanisms underlying COM, especially through preclinical approaches.

The seventh cluster deals with antibiotic resistance and microbial pathogens. Defined by keywords such as "vancomycin" and "methicillin-resistant *Staphylococcus aureus* (MRSA)," this group addresses the challenges of resistant infections and explores antimicrobial treatment strategies.

Finally, the eighth cluster focuses on alternative surgical interventions, centered around the keyword "myringoplasty." This group covers literature examining less invasive surgical techniques beyond tympanoplasty, particularly those applied in pediatric populations.

Discussion

The findings of this bibliometric analysis provide a detailed picture of the evolving nature of scientific production in the field of *Chronic Otitis Media* (COM). The data reveal a marked increase in academic output on COM beginning in the early 2000s, with a pronounced acceleration after 2010. This trend underscores the shift in COM research from being a narrowly defined clinical issue in otolaryngology to a broad and interdisciplinary domain integrating contributions from microbiology, pediatrics, neurology, pathology, and public health.

While there were relatively few publications on COM in the 1970s and 1980s, a gradual increase began in the 1990s. However, this growth remained modest until the early 2000s, when advances in diagnostic imaging, surgical innovation, and emerging concerns around antibiotic resistance spurred a noticeable expansion in the literature. During this period, particular attention was paid to pediatric populations, with applied topics such as treatment efficacy and complication management gaining prominence.

The post-2020 surge in COM-related publications likely reflects the heightened global interest in infectious diseases during the COVID-19 pandemic. Given the infectious nature of COM, the pandemic-era increase in publications may also indicate growing concern for the broader implications of ear infections within the context of public health. This expansion points to a diversification of research interests beyond clinical management, extending into patient behavior, education, and healthcare systems.

Thus, the temporal distribution of publications reflects not only quantitative growth but also thematic diversification and enhanced interdisciplinary integration. The structural transformation of COM-related academic output suggests a continued trajectory of expansion in future research.

Examining the most cited publications provides insight into the dominant thematic currents and high-impact studies shaping the field. Most of these publications focus on practical, clinically relevant areas such as surgical treatment, microbiological agents, and complication management. This indicates that both scholars and clinicians are primarily drawn to research with direct implications for patient outcomes and therapeutic success.

One of the most cited works, the biofilm study by Hall-Stoodley et al. [25], introduced a novel perspective on COM pathogenesis by highlighting the clinical importance of biofilm formation—shifting attention beyond conventional microbial cultures. The study serves as a key reference for understanding and managing antibiotic-resistant infections.

Similarly, the randomized controlled trial by Gates et al. [26], which evaluated the effectiveness of adenoidectomy and tympanostomy tubes in pediatric patients, has been widely influential in shaping surgical treatment strategies. Maw's [28] prospective study also examined the long-term outcomes of adenotonsillectomy procedures. Both studies underscore the central role of surgical intervention in pediatric otolaryngology for COM.

Other high-impact studies focus on complication frequency, microbiological profiling, and auditory outcomes. For instance, Osma et al. [27] conducted a retrospective study in Turkey that highlighted the prevalence and severity of COM-related complications. Nadol et al. [30], on the other hand, developed the Chronic Ear Survey—a patient-reported outcome tool that systematically assesses the daily-life impact of COM.

Collectively, the most frequently cited articles are predominantly practice-oriented, targeting treatment protocols and complication management, and are often centered on pediatric populations. This indicates that the clinical importance of COM extends beyond anatomical and pathophysiological concerns, encompassing quality of life and healthcare system implications. The pediatric dominance in the literature aligns with the epidemiological reality that COM is most prevalent in children, illustrating a strong relationship between research orientation and patient demographics.

Keyword co-occurrence analyses offer powerful tools for identifying the conceptual structures underlying scientific literature. The co-occurrence analysis conducted in this study identified eight key thematic clusters in COM research. These clusters highlight how knowledge production in the field is organized around distinct focal points. They reflect the dual emphasis on clinical applications and basic scientific inquiry, offering a comprehensive view of the literature's multidimensional character.

Surgical interventions—represented by keywords like "tympanoplasty" and "mastoidectomy"—remain central to COM research, indicating that surgery continues to be a principal treatment modality. Similarly, keywords such as "cartilage" and "grafts" signify ongoing efforts to refine reconstructive techniques and enhance surgical outcomes.

Clusters encompassing terms like "cholesteatoma," "bone resorption," and "ossicular discontinuity" represent literature on structural deterioration in advanced disease stages, while others focus on more specialized topics including antimicrobial resistance ("vancomycin," "MRSA"), animal models, neurological complications, and histopathological findings. These areas demonstrate that COM research extends well beyond treatment protocols, delving into pathogenesis, systemic impact, and molecular mechanisms.

In sum, the keyword co-occurrence map highlights the heterogeneity of knowledge production in COM and underscores its value as a rich field for both clinical practice and basic research. The thematic diversity identified is also of strategic importance for guiding future research directions.

The bibliometric findings of this study clearly demonstrate that COM research is not confined to otolaryngology. On the contrary, it is characterized by a robust interdisciplinary framework that draws from a variety of scientific fields. The thematic clusters identified via keyword mapping reveal that COM is examined in relation to microbiological pathogens, neurological complications, pediatric infections, and pathological progression.

Research on COM pathogenesis frequently overlaps with microbiology, especially concerning biofilm formation, antibiotic resistance, and microbial diversity. These themes require analytical tools beyond traditional ENT approaches and point to an increasing role for molecular biology and genetics in future studies.

Pediatrics remains one of the most prominent disciplines contributing to the COM literature. Given the high prevalence of COM in childhood, and its potential developmental, linguistic, and educational consequences, it is essential that researchers in child development and educational policy remain engaged in this area.

Complications in advanced COM cases—such as sensorineural hearing loss, facial nerve paralysis, and intracranial involvement—are closely related to neurology and pathology. These complications necessitate neurological evaluations and advanced imaging, reinforcing the importance of multidisciplinary collaboration in clinical settings.

Finally, from a public health perspective, COM should be recognized as a common infectious disease in developing countries that significantly affects quality of life and, if untreated, can lead to severe outcomes. Epidemiological research, health policy analysis, and economic burden assessments are critical for designing preventive healthcare services and improving access to treatment.

In conclusion, successful diagnosis, treatment, and management of COM require the coordinated efforts of professionals in otolaryngology, pediatrics, microbiology, neurology, pathology, and public health. Encouraging interdisciplinary research is essential for reducing the disease burden and developing more effective and integrated treatment strategies.

Conclusion

This study examined the academic literature on *Chronic Otitis Media* (COM) using bibliometric methods, offering a multidimensional perspective on the historical development, thematic concentrations, and structural dynamics of the field. Based on the analysis of 1,039 articles retrieved from the Web of Science (WoS) database—limited to those written in English and containing the phrase "Chronic Otitis Media" in the title—the study not only quantitatively assessed the volume of academic production but also provided a detailed account of how scholarly interests have evolved over time.

The temporal distribution of publications demonstrates that COM has attracted increasing attention as a research area, particularly after the early 2000s. This surge reflects a period in which both clinical needs and technological advancements accelerated scientific inquiry. The sustained level of publication following the COVID-19 pandemic further suggests that COM continues to be a clinically significant issue within global health systems.

One of the study's original contributions lies in its detailed mapping of thematic clusters within the literature. Research clustered around topics such as surgical interventions, grafting techniques, microbiological approaches, complication management, and experimental models reflects the multidimensional nature of COM. Moreover, the fact that the most frequently cited publications are predominantly clinically oriented reveals a strong alignment between academic inquiry and practical healthcare concerns.

Overall, the literature on COM is characterized by both expansion and diversification, demonstrating a rich research potential spanning both basic sciences and clinical practice. In this context, the bibliometric analysis provides a strategic framework that can guide researchers and policymakers by charting the landscape of knowledge production in the field.

The findings from this study clearly reveal not only a quantitative growth in the scientific literature on COM but also significant thematic transformations. The steady increase in publication output over the years underscores the growing global relevance of COM as a healthcare concern. Especially over the past fifteen years, research on COM has increasingly been regarded as a comprehensive field encompassing clinical management, healthcare policy, and the economic burden of disease.

The most highly cited publications primarily focus on therapeutic approaches, surgical techniques, complication management, and microbiological

foundations—areas that directly translate into clinical practice. Studies on surgical success rates, strategies targeting biofilm formation, and management of auditory sequelae demonstrate that the insights gained through research have tangible implications for clinical decision-making.

The thematic mapping based on keyword co-occurrence analysis highlights the interdisciplinary nature of COM research. Contributions from microbiology, histopathology, and neurology—alongside otolaryngology—reveal the need to consider COM as a complex clinical condition requiring holistic approaches. Notably, clusters surrounding terms such as "sensorineural hearing loss," "facial paralysis," and "cochlear changes" emphasize the long-term consequences and systemic implications of the disease.

Collectively, the findings of this study illustrate that COM is a multifaceted healthcare issue and that progress in research has a direct impact on clinical practice. The mapping of research trends enables a reassessment of existing knowledge and the identification of new areas of inquiry. In this regard, bibliometric findings reflect not only the intensity of academic interest but also the real-world relevance of scientific output.

This study offers a strategic roadmap for researchers by identifying dominant themes and emerging areas of opportunity within the field of COM. Topics such as antibiotic resistance, long-term outcomes of complications, and experimental studies using preclinical models present high potential for future investigation. Furthermore, patient-centered outcome measures can be integrated with broader datasets and evaluated within the context of healthcare policy.

It is important to acknowledge the study's limitations. This analysis was based solely on the WoS database and therefore does not include publications indexed in other databases such as PubMed, Scopus, or Embase. Moreover, the dataset was restricted to articles containing "Chronic Otitis Media" in the title, which may have excluded relevant studies addressing the topic under alternative headings. Future research should consider broader database combinations and full-text content analyses to yield more comprehensive bibliometric insights.

Conflict of interests

The author declare that has no conflicts of interest.

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References

[1] Lewis A.T., Backous D., Choi B.Y., Jaramillo R., Kong K., Lenarz T., Hol M.K. Healthcare consumption among subjects with otitis media undergoing middle ear surgery—analysis of cost drivers, *European Archives of Oto-Rhino-Laryngology*, 280(1) (2023) 175-181.

[2] Yang Y.Y., Guo L.R. Misdiagnosis of a fungus ball in the middle ear as chronic suppurative otitis media, *The Journal of Infection in Developing Countries*, 18(11) (2024) 1793-1797.

[3] Bazzout A., Lachkar A., Benfadil D., Tsen A.A., Ghailan R. An chronic otitis media with effusion complicated with paravertebral abscess: Case report and review of the literature, *International Journal of Surgery Case Reports*, 79 (2021) 104-107.

[4] Sun J., Sun J. Intracranial complications of chronic otitis media, *European Archives of Oto-Rhino-Laryngology*, 271 (2014) 2923-2926.

[5] Mili M.K., Kalita S., Sarmah M., Talukdar S., Goswami S. Complications of chronic otitis media and their management: a study at tertiary care centre, *International Journal of Research in Medical Sciences*, 11(11) (2023) 4082.

[6] Baysal E., Erkutlu I., Mete A., Alptekin M., Oz A., Karataş Z., Çelenk F., Mumbuç S., Kanlıkama M. Complications and Treatment of Chronic Otitis Media, *Journal of Craniofacial Surgery,* 24 (2013) 464–467.

[7] Dhingra S., Vir D., Bakshi J., Rishi P. Mapping of audiometric analysis with microbiological findings in patients with chronic suppurative otitis media (CSOM): a neglected clinical manifestation, *Critical Reviews in Clinical Laboratory Sciences*, 60 (2023) 212 - 232.

[8] Hutz M., Moore D., Hotaling A. Neurological Complications of Acute and Chronic Otitis Media, *Current Neurology and Neuroscience Reports*, 18 (2018) 1-7.

[9] Khairkar M., Deshmukh P., Maity H., Deotale V. Chronic Suppurative Otitis Media: A Comprehensive Review of Epidemiology, Pathogenesis, Microbiology, and Complications, *Cureus*, 15(8) (2023) e43729.

[10] Gkrinia E., Brotis A., Vallianou K., Ntziovara A., Hajiioannou, J. Otogenic Brain Complications: A Systematic Review and Meta-analysis, *The Journal of laryngology and otology,* (2024) 1-35.

[11] Mushi M.F., Mwalutende A.E., Gilyoma J.M., Chalya P.L., Seni J., Mirambo M.M., Mshana S.E. Predictors of disease complications and treatment outcome among patients with chronic suppurative otitis media attending a tertiary hospital, Mwanza Tanzania, *BMC Ear Nose Throat Disord*, 7 (2016) 16:1.

[12] Laws J.C., Jordan L.C., Pagano, L.M., Wellons III J.C., Wolf M.S. Multimodal neurologic monitoring in children with acute brain injury, Pediatric neurology, 129 2022 62-71.

[13] Kang J.M., Kim Y.J., Kim J.Y., Cho E.J., Lee J.H., Lee M.H., Yoo K.H. Neurologic complications after allogeneic hematopoietic stem cell transplantation in children: analysis of prognostic factors, *Biology of Blood and Marrow Transplantation*, 21(6) 2015 1091-1098.

[14] Kaźmierczak W., Janiak-Kiszka J., Budzyńska A., Nowaczewska M., Kaźmierczak H., Gospodarek-Komkowska E. Analysis of pathogens and antimicrobial treatment in different groups of patients with chronic otitis media, *The Journal of Laryngology & Otology*, 136 (2021) 219 - 222.

[15] Kim S.H., Kim M.G., Kim S.S., Cha S.H., Yeo S.G. Change in Detection Rate of Methicillin-Resistant Staphylococcus aureus and Pseudomonas aeruginosa and Their Antibiotic Sensitivities in Patients with Chronic Suppurative Otitis Media, *Journal of International Advanced Otology*, 11(2) (2015) 151-6.

[16] Rubini A., Ronzani G., D'Alessandro E., Marchioni D. Management of Otogenic Meningitis: A Proposal for Practical Guidelines from a Multicenter Experience with a Systematic Review*, J Clin Med*, 13(18) (2024) 5509.

[17] Faiz S.M., Bhargava A., Srivastava S., Gupta R. K., Parveen M., Bhatt K., Singh A. Analysis of hearing improvement by various ossiculoplasty materials (autologous versus prostheses) in chronic otitis media patients, *International Journal of Otorhinolaryngology and Head and Neck Surgery*, 9(1) (2023) 54-7.

[18] Luers J.C., Hüttenbrink K.B. Surgical anatomy and pathology of the middle ear, *Journal of Anatomy*, 228(2) (2016) 338-353.

[19] Schilder A., Marom T., Bhutta M., Casselbrant M., Coates H., Gisselsson-Solen M., Hall A., Marchisio P., Ruohola A., Venekamp R., Mandel E. Otitis Media: Treatment and Complications, *Otolaryngology–Head and Neck Surgery*, 156 (2017) 88-105.

[20] Alsharif A.H., Salleh N.Z.M., Baharun R. Bibliometric analysis, *Journal of Theoretical and Applied Information Technology*, 98(15) (2020) 2948-2962.

[21] Persson O., Danell R., Schneider J.W. How to use Bibexcel for various types of bibliometric analysis. In F. Åström, R. Danell, B. Larsen, J.W. Schneider (Eds.), Celebrating Scholarly Communication Studies: A Festschrift for Olle Persson at his 60th Birthday, *International Society for Scientometrics and Informetrics,* (05) (2009) 9-24.

[22] Pritchard A. Statistical bibliography or bibliometrics, *Journal of Documentation*, 25(4) (1969) 348-349

[23] Jacso P. As we may search-comparison of major features of the Web of Science, Scopus, and Google Scholar citation-based and citation-enhanced databases, *Current Science*, 89(9) (2005) 1537-1547.

[24] Yadav M., Dangi A.A Bibliometric study on Gamification and its Role in Users Engagement, *Pacific Business Review International*, 14(8) (2022) 62-72.

[25] Hall-Stoodley L., Hu F.Z., Gieseke A., Nistico L., Nguyen D., Hayes J., Kerschner J.E. Direct detection of bacterial biofilms on the middle-ear mucosa of children with chronic otitis media, *JAMA*, 296(2) (2006) 202–211.

[26] Gates G.A., Avery C.A., Prihoda T.J., Cooper J.C. Effectiveness of adenoidectomy and tympanostomy tubes in the treatment of chronic otitis media with effusion, *New England Journal of Medicine*, 317(23) (1987) 1444–1451.

[27] Osma U., Cureoglu S., Hosoglu S. The complications of chronic otitis media: Report of 93 cases, *The Journal of Laryngology & Otology*, 114(2) (2000) 97–100.

[28] Maw A. R. Chronic otitis media with effusion and adeno-tonsillectomy—a prospective randomized controlled study, *International Journal of Pediatric Otorhinolaryngology*, 6 (1984) 239–246.

[29] Zinkus P.W., Gottlieb M.I., Schapiro M. Developmental and psychoeducational sequelae of chronic otitis media, *American Journal of Diseases of Children*, 132(11) (1978) 1100–1104.

[30] Nadol J.B., Staecker H., Gliklich R. E. Outcomes assessment for chronic otitis media: The Chronic Ear Survey, *The Laryngoscope*, 110(94) (2000) 32–35.

[31] Mandel E.M., Rockette H.E., Bluestone C.D., Paradise J.L., Nozza R.J. Efficacy of myringotomy with and without tympanostomy tubes for chronic otitis media with effusion, *The Pediatric Infectious Disease Journal*, 11(4) (1992) 270–277.

[32] Brook I., Finegold S.M. Bacteriology of chronic otitis media, *JAMA*, 241(5) (1979) 487–488.

[33] Riding K.H., Bluestone C.D., Michaels R.H., Cantekin E.I., Doyle W.J., Poziviak C.S. Microbiology of recurrent and chronic otitis media with effusion, *The Journal of Pediatrics*, 93(5) (1978) 739–743.

[34] DeMaria T.F., Prior R.B., Briggs B.R., Lim D.J., Birck H.G. Endotoxin in middle-ear effusions from patients with chronic otitis media with effusion, *Journal of Clinical Microbiology*, 20(1) (1984) 15–17.

[35] Meyerhoff W.L., Kim C.S., Paparella M.M. Pathology of chronic otitis media, Annals of Otology, Rhinology & Laryngology, 87(6) (1978) 749-760.

[36] Mandel E.M., Rockette H.E., Bluestone C.D., Paradise J.L., Nozza R.J. Myringotomy with and without tympanostomy tubes for chronic otitis media with effusion*, Archives of Otolaryngology–Head & Neck Surgery*, 115(10) (1989) 1217-1224.

[37] Zinkus P.W., Gottlieb M.I. Patterns of perceptual and academic deficits related to early chronic otitis media, *Pediatrics*, 66(2) (1980) 246-253.

[38] Brook I. The role of anaerobic bacteria in chronic suppurative otitis media in children: implications for medical therapy, *Anaerobe*, 14(6) (2008) 297-300.

[39] English G.M., Northern J.L., Fria T.J. Chronic otitis media as a cause of sensorineural hearing loss, *Archives of Otolaryngology*, 98(1) (1973) 18-22.

[40] Gates G.A., Avery C.A., Prihoda T.J. Effect of adenoidectomy upon children with chronic otitis media with effusion, *The Laryngoscope*, 98(1) (1988) 58-63.

[41] Smith J.A., Danner C.J. Complications of chronic otitis media and cholesteatoma, *Otolaryngologic Clinics of North America*, 39(6) (2006) 1237-1255.

[42] Costa S.S.D., Rosito L.P.S., Dornelles C. Sensorineural hearing loss in patients with chronic otitis media, *European Archives of Oto-Rhino-Laryngology*, 266 (2009) 221-224.

[43] Alles R., Parikh A., Hawk L., Darby Y., Romero J.N., Scadding G. The prevalence of atopic disorders in children with chronic otitis media with effusion, *Pediatric Allergy and Immunology*, 12(2) (2001) 102-106.

[44] Phillips J.S., Haggard M., Yung M. A new health-related quality of life measure for active chronic otitis media (COMQ-12): development and initial validation, *Otology & Neurotology*, 35(3) (2014) 454-458.