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ORIGINAL ARTICLE

# A bibliometric analysis of *Community Dentistry and Oral Epidemiology*: Fifty years of publications

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## Abstract

**Objectives:** In celebration of the journal's 50th anniversary, the aim of the study was to review the whole collection of *Community Dentistry and Oral Epidemiology* (CDOE) publications from 1973 to 2022 and provide a complete overview of the main publication characteristics.

**Methods:** The study used bibliometric techniques such as performance and science mapping analysis of 3428 articles extracted from the Scopus database. The data were analysed using the 'Bibliometrix' package in R. The journal's scientific production was examined, along with the yearly citation count, the distribution of publications based on authors, the corresponding author's country and affiliation and citation count, citing source and keywords. Bibliometric network maps were constructed to determine the conceptual, intellectual and social collaborative structure over the past 50 years. The trending research topics and themes were identified.

**Results:** The total number of articles and average citations has increased over the years. D Locker, AJ Spencer, A Sheiham and WM Thomson were the most frequently published authors, and PE Petersen, GD Slade and AI Ismail published papers with the highest citations. The most published countries were the United States, United Kingdom, Brazil and Canada, frequently engaging in collaborative efforts. The most common keywords used were 'dental caries', 'oral epidemiology' and 'oral health'. The trending topics were healthcare and health disparities, social determinants of health, systematic review and health inequalities. Epidemiology, oral health and disparities were highly researched areas.

**Conclusion:** This bibliometric study reviews CDOE's significant contribution to dental public health by identifying key research trends, themes, influential authors and collaborations. The findings provide insights into the need to increase publications from developing countries, improve gender diversity in authorship and broaden the scope of research themes.

KEYWORDS
bibliometric analysis, network maps, oral epidemiology, performance analysis, scientometrics; community dentistry

## 1 | INTRODUCTION

*Community Dentistry and Oral Epidemiology* (CDOE) is a peer-reviewed international journal in community dentistry with a broad scope ranging from original studies in epidemiology, behavioural sciences related to dentistry and health services research to methodological reports in program planning, implementation and implementation evaluation. The first issue was published in October 1973 by Blackwell Munksgaard Journals, with two more issues published the same year. Currently, the journal publishes at least six issues yearly, and until now, there have been 51 volumes and 10 special-themed issues under Wiley-Blackwell publications. In the Scimago Journal Rank (SJR) powered by Scopus, CDOE is featured in the first quartile (Q1) of the journals listed. According to Journal Citation Indicator Clarivate (2022), the journal is ranked 57/92 and 147/210 in Dentistry, Oral Surgery & Medicine and the Public, Environmental and Occupational Health category and had an impact factor of 2.48. The current editor-in-chief is Professor Sarah R Baker, with previous editors-in-chief being WM Thomson, AJ Spencer, BA Burt, O Fejerskov and JJ Pindborg.

Bibliometric analysis (bibliometrics) combines various frameworks, tools and techniques to examine and analyse citations of scholarly publications. This has resulted in the development of several metrics which provide insights into the intellectual structure of a broad academic discipline, assess the performance of scientific journals and identify developing trends in article topics, cooperation patterns and research components.[1] Interpretations rely on objective and subjective assessments developed through well-informed approaches and procedures, such as performance analysis and science mapping.[2] Several highly cited dental journals have used bibliometrics analysis and found that dental research is becoming increasingly global, with authors from multiple countries and fields frequently collaborating.[3–5]

The CDOE journal is celebrating its 50th anniversary in 2023. This article retrospectively views the journal's journey and contribution to dental public health (DPH). Such a bibliometric analysis of a single journal provides a systematic approach to studying its scientific literature using statistical techniques to track its contributions, impact and progression.[6] Bibliometrics can inform the editors about future research topics or authors to feature in the journal and evaluate the effectiveness of any changes in the editorial policies or publishing models. Additionally, funders can identify areas that require additional funding by identifying the most highly cited articles and authors. This study examines the bibliometric and intellectual structure of CDOE since its inception using a bibliometric approach and various bibliometric analytical tools. The methods were of two types: performance analysis and scientific mapping. In the performance analysis, the aim is to: (1) analyse publication and citation trends; (2) identify the most cited papers in the journal over the last 50 years; and (3) identify CDOE's most cited authors (and their affiliated institutions). The science mapping tools were used to understand the conceptual, intellectual and social framework among various entities such as (1) collaboration among authors, universities and countries; (2) co-citation of authors; (3) co-occurrences of keywords and (4) identifying prominent themes and trend topics in CDOE, along with their evolution over time.

## 2 | METHODS

### 2.1 | Search strategy

The Scopus electronic database was searched on January 7, 2023, from October 1973 to December 2022. The search subject was 'CDOE' in the source title. The search was restricted to articles and reviews, with other publications excluded. For this purpose, the filter 'article type' was used in Scopus. Two independent reviewers (S.N. and L.M.J.) were involved in the process.

### 2.2 | Data analysis

The file was downloaded in BibTeX format from Scopus. The downloaded data consisted of information on article type, author's name and affiliation, details of citations, abstract and author keywords. Further analysis was carried out using RStudio (RStudio), using the 'Bibliometrix' (University of Naples Federico II)[2] package. The codes are available at http://rpubs.com/sonianath/1022496.

### 2.3 | Performance analysis

A descriptive overview of the dataset was undertaken, including an analysis of document types, the total number of publications per year to determine publication patterns, the number of cited publications and the total number of citations. The publication impact was calculated as the total citation per publication.

A world map was constructed to show the distribution of publications by country. The authors' affiliations were traced and examined to determine the number of single-country publications (SCP) and multi-country publications (MCP). MCP represents a paper with at least two co-authors from different countries. The total number of documents published in CDOE from the top 25 countries, the total citation received and their progression over time was assessed. The top 10 universities with the most published documents and their production over time were identified.

The 25 most productive authors were chosen based on the number of documents published between 1973 and 2022. The h-index, g-index and m-index (Appendix A) were the criteria for determining the authors with the most influence or impact. The percentage of times an author is listed as the first author of a multi-authored publication is calculated as the author's dominance factor (DF), representing the author's dominance in publishing research articles.[7] The most cited top 25 CDOE authors were identified based on the citation count from the journal's inception. Lotka's law was calculated, which describes an author's productivity by measuring the authors' frequency of publication in CDOE.[8]

To measure the impact of a publication, the number of global and within-journal citations received per year was calculated. The top 25 references cited most frequently by CDOE authors were assessed. The most frequently used author's keywords were identified

and used to determine the main trending themes of the journal. The Sankey plot[9] was for the top 20 most productive countries, authors and their relationship with commonly used authors' keywords.

### 2.4 | Science mapping

Bibliometric network maps are powerful tools for visualizing and exploring data. The association method was used for normalization, auto cluster logarithm and Walktrap network cluster was used for network mapping. Network maps at three structural levels were used: social, conceptual and intellectual.

The social network maps represent the collaboration networks among countries, institutions and authors. The social network map comprised nodes/circles representing authors, countries or institutions. A countries' collaboration world map was constructed to demonstrate which countries are working together. A collaboration of more than five times was represented on the map. The co-occurrence network is a co-word cluster network consisting of the author's keywords frequently used in studies.[10] Co-citation analysis is a type of document coupling that counts how many papers have cited a specific set of documents.[11] When a researcher references a particular author's work alongside another author's work in a new document, this is called co-citing authors.[11]

### 2.5 | Thematic maps, thematic evolution, factorial analysis

The thematic map is organized into four quadrants, and themes were arranged into a single circle and mapped as a two-dimensional image based on their impact and centrality (Appendix A). A thematic evolution map was constructed based on a split of the total period into four periods: 1973–1985, 1986–1995, 1996–2015 and 2016-2022—the last period comprised 7 years to understand the most current trends.

The most critical topics in a journal may be found by performing a factor analysis on the author's keywords. The factorial analysis generates a conceptual structure map and topic dendrogram.[12] The endpoint is different clusters distinct from one another but consisting of documents that express a familiar concept. A dendrogram is a tree diagram that shows associations between objects; it shows how the clusters that resulted from the corresponding analysis are arranged.

## 3 | RESULTS

### 3.1 | Overview

The workflow of the study from search strategy, screening and included records is shown in Figure S1. The Scopus search resulted in 3438 documents (excluding 15 erratum, 33 Letters, 31 conference papers, 30 editorials and 29 commentaries), including 3320 original research articles and 118 reviews with contributions from 9010 authors. Table S1 and Appendix B describe the summary statistics of the journal for the last 50 years. Figure 1 and Table S2 display the CDOE publications and citations pattern between 1973 and 2022.

Most publications were from North America, Australia or Europe. Among Asian countries, China had the highest number of articles (307), followed by Thailand (75) and India (73) (Figure 2A). The African continent had publications from only two countries: 132 from South Africa and 52 from Tanzania. Similarly, Brazil had the highest country representation in the South American continent, with 875 articles. The United States had 27 publications in 1975, which grew to 1991 by 2022 with 10 225 total citations (Figure 2B, Table S3). By the end of 2022, the second highest country was the UK, with 1472 articles and 7754 citations. Brazil followed, with 875 published articles and 3695 citations, followed closely by the Netherlands (articles: 800; citations: 3177) and Australia (articles:745; citations: 3213). A similar pattern was

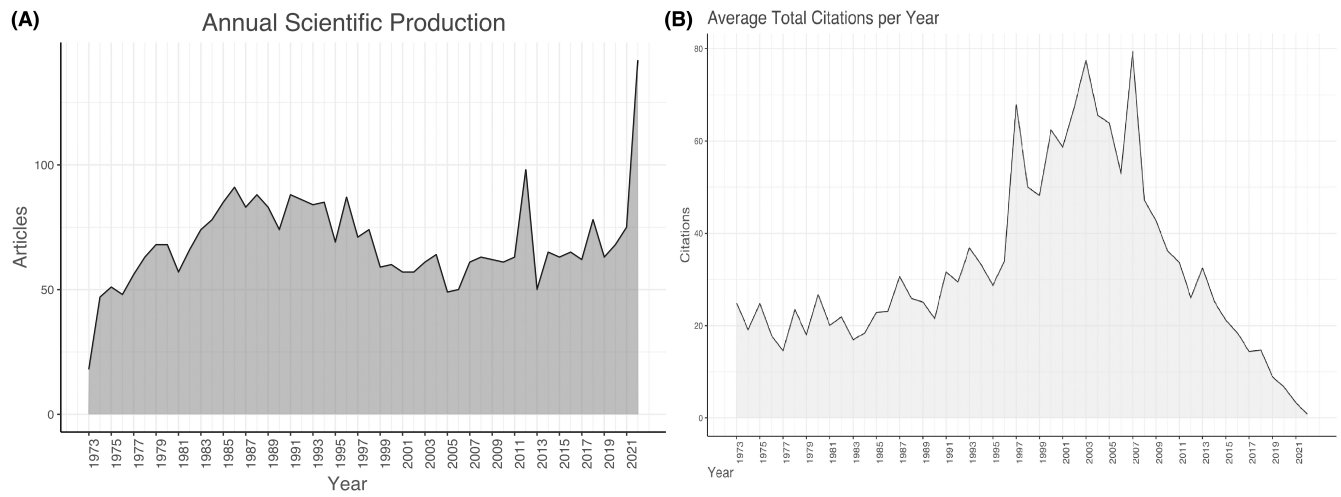


FIGURE 1 (A)The annual scientific production. (B) The total citation count per year.

observed for the most productive countries of corresponding authors, with the United States having 206 SCP and 42 multiple-country publications (MCP) (Figure 2C, Table S4).

Figure 2D describes the most prolific authors' production over the 50 years. The most prolific author in a single year was Professor ECM Lo of The University of Hong Kong, who published eight documents in 1994. The late Professor D Locker, from the University of Toronto, was the second most productive author, publishing seven articles in 1996 and five papers each in 2007 and 2009. D Locker had an enormous presence with active years from 1987 to 2012, publishing 62 research articles. The authors with the maximum citation in a year included PE Petersen (76.00; 2003), AI Ismail (66.35; 2007) and GD Slade (57.70; 1997). D Locker had the highest total citation of 5217 and a citation impact factor of 84.15, with all his papers cited at least once and the highest h-index of 41 among all the authors published in CDOE (Table S5). Professor AJ Spencer, from the University of Adelaide, published his first paper in 1978 and had 59 articles published up to 2022. The late Emeritus Professor A Sheiham, a prominent epidemiologist in oral health research from University College London, had an h-index of 26 and contributed to 47 publications, with his first article published in 1974. According to the dominance ratio, J Rise, PE Petersen and J Grytten published the highest number of first-author articles in multi-authored publications (Table S6). There were no women who reached the highest threshold in these author-level metrics. The results of Lotka's law indicate that 72% of the authors contributed to at least one article, and 14% of authors published a second time in CDOE (Table S7). The University of Adelaide had the highest number of publications, starting with three publications in 1997 and rapidly increasing to 248 articles by 2022. Similarly, University College London increased from one publication in 1997 to 94 publications in 2022 (Table S8).

The most cited document globally was the World Oral Health Report (WHO) in 2003 for improving oral health and approaches of the global health programme (Table S9).[13] In 2005, another WHO document (4th most cited) on improving oral health for older people was popular among readers.[14] Both documents were authored by PE Petersen, which received 1596 and 707 citations, respectively, with an average citation of 76 and 37 per year. The second most influential publication was on the derivation and validation of the short form of the oral health impact profile (OHIP), authored by GD Slade (1997),[15] which received 1471 citations, with around 54 citations per year. The article defining the caries scoring system, "International Caries Detection and Assessment System (ICDAS), received the third highest total citations of 828.[16] Appendix C, Table S10–S13, describes similar trends among CDOE authors.

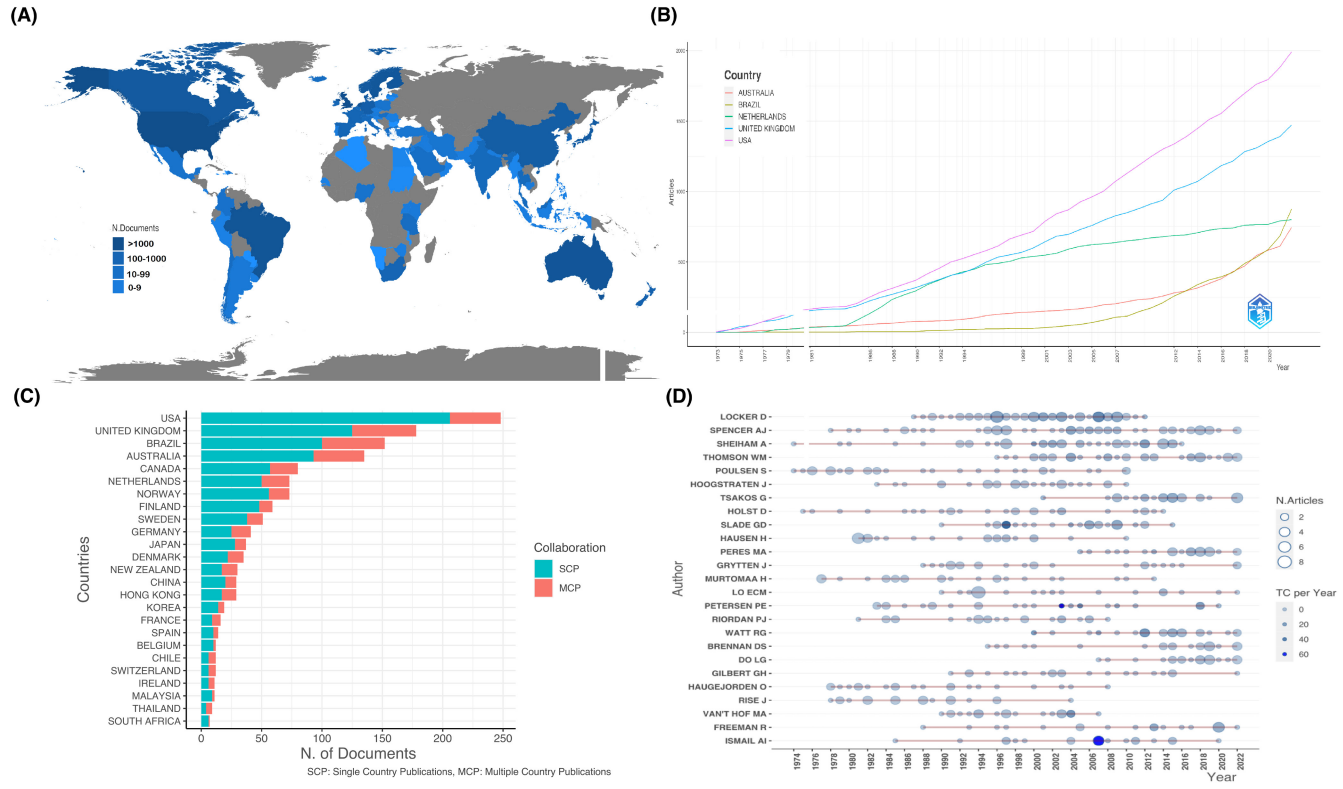


FIGURE 2 The country and authors' production over time. (A) The country's scientific production map. The darker the blue colour, the higher the number of publications. The grey areas represent no publication. (B) The country's scientific production over time. Showing for top five countries: USA, UK, Netherlands, Brazil and Australia. (C) The most productive countries. The blue bar indicates single country publication (SCP), and the red bar as multiple country publication (MCP). (D) The author's production over time. The map shows the volume of articles in the year, represented by a proportionate increase in circle size and the effect as measured by the yearly citation as shown by the circle's colour (the darker the colour, the higher the article impact).

The most frequently used words were dental caries (672 times), oral epidemiology (354), oral health (428), children (136), quality of life (105), oral hygiene (87), dental care (85), adults (78), fluoride (77) and periodontal disease (77) (Table S14; Figure S2). The trend topics graph displays the terms appearing five or more times annually (Figure S3). In the last 5 years, the trending topics were healthcare and health disparities, health behaviour, cohort studies, dental visit, social determinants of health, structural equation modelling, systematic review and health inequalities. The declining topics were dental prophylaxis, dentifrice, dental plaque, gingivitis and dental injuries. The three-field plot (Figure S4, Appendix D) shows the relationship between the top 20 authors with keywords and countries.

## 3.2 | Science mapping

The collaboration network (Figure 3A) describes how many authors, countries and institutions worked together in CDOE. AJ Spencer, DS Brennan, LG Do, GD Slade, D Locker, WM Thomson, S Lahti and R Freeman (red cluster) were strongly connected in author collaborations. Another group of authors working closely with this group were MA Peres, KG Peres, A Sheiham, G Tsakos and RG Watt (green cluster). The collaboration of authors was analysed based on closeness and betweenness. The 'betweenness' centrality captures the degree to which a particular vertex is located on the shortest pathways connecting other vertices.[17] In other words, it aids in finding people who act in a 'bridge spanning' capacity inside a network and significantly impacts the flow of information and ideas in the field. S Lahti, AJ Spencer, WM Thomson, H Hausen, RK Celeste and G Slade had the highest betweenness centrality (Table S15). This 'closeness' centrality indicates that these authors communicated most with others in the collaboration.[17] The authors with closeness centrality included O Haugejorden, J Rise, JM Birkeland, AJ Spencer, WM Thomson, A Sheiham, MA Peres, S Lahti, GD Slade and LG Do (Table S16). These authors were well-connected to other authors in their field and may have influenced the direction of the research.

The University of Adelaide collaborated the most with other institutions, including University College London, University of Toronto and University of Sheffield (Figure 3B). The countries collaborating actively with other countries include the United Kingdom, the USA, Brazil, the Netherlands, Australia, Sweden and Canada (Figure S5). The collaboration network map Figure 3C showed strong connections between the UK, USA and Australia. The second cluster consisted of Sweden, Denmark and Norway.

Figure 3D shows two clusters of authors frequently co-citing each other. The first cluster consisted of D Locker and GD Slade. The main theme among this group of authors was oral epidemiology and public health. The second cluster comprised BA Burt, J Ainamo

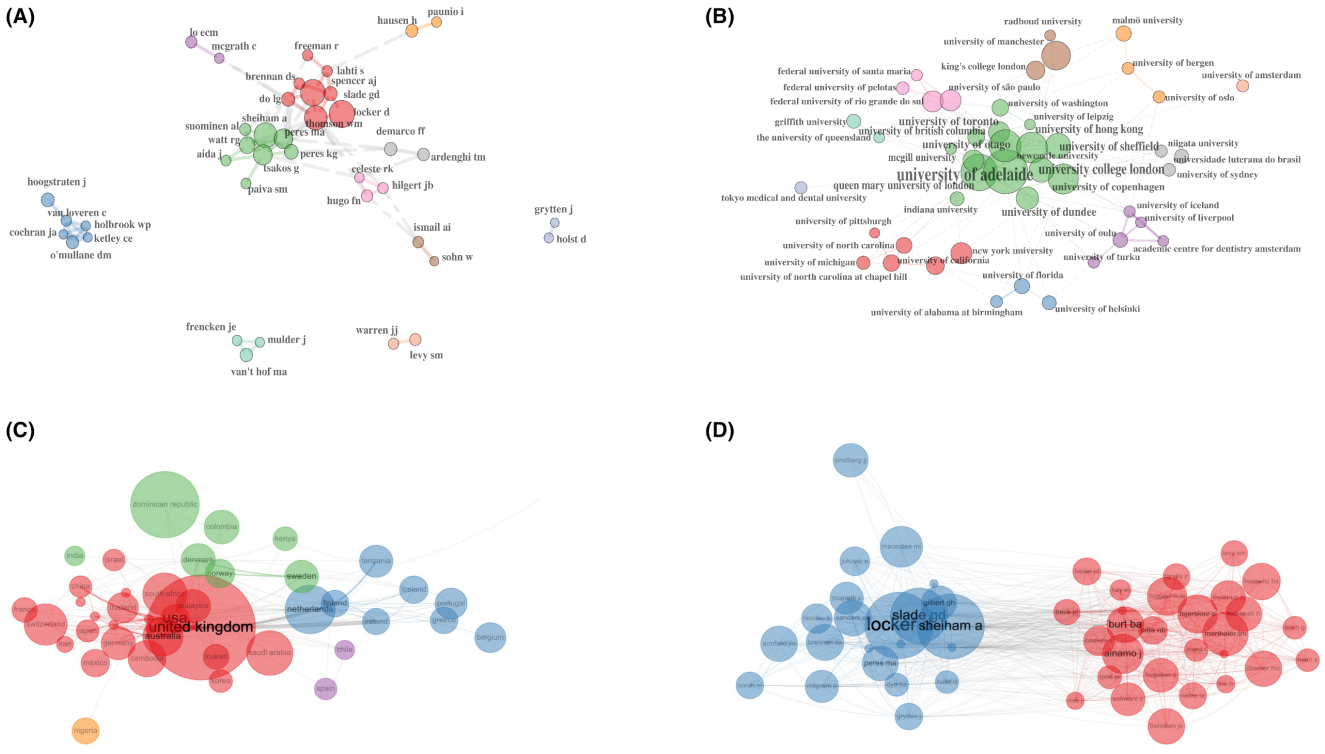


FIGURE 3 Scientific network maps. The nodes represent the entities, and the edges are the connection. The thickness of an edge indicates how frequently two entities occur, while the node's size depends on the entity's frequency of occurrence. The relative positions of the node represent the inter-relatedness of these nodes, and a different colour represents different groups formed by clusters of related nodes. (A) Authors' collaboration network maps. (B) Affiliation collaboration network maps. (C) Country collaboration network maps. (D) Author's co-citation network map.

and NB Pitts. The central theme among the second group of authors was prevention, fluorides and dental caries. The keyword occurrence map shows the relationship between common keywords as a network (Figure S6, Appendix E).

### 3.3 | Factorial analysis

A conceptual structure map of keywords using multiple correspondence analysis is shown in Figure 4A. The most significant cluster (red) consisted of 'socio-economic', 'risk factors', 'prevalence', 'dental health surveys', 'dental caries' and 'oral epidemiology'. The green and purple clusters included keywords related to caries prevention. The orange cluster consisted of topics related to public health and disparities. The blue cluster had keywords related to oral diseases, such as periodontal disease, tooth loss and health research services.

The thematic map is divided into four sections representing themes (Figure 4B). 'Epidemiology', 'oral health', 'quality of life', 'public health' and 'disparities' were highly researched areas (green circle, high density and low centrality). These topics have been the fundamental and core areas of the journal. The highly relevant (high centrality) and underdeveloped (low density) themes were 'dental caries', 'children' and 'fluoride' (pink circle). The declining or emerging themes were 'dental anxiety', 'oral health-related quality of life (OHRQoL)', 'behavioural dental science', 'validity', 'reliability' and 'dental fear'.

Figure 4C represents the evolution of themes split into four periods. In the first two periods between 1973–1985 and 1986–1995, the common themes for the journal were 'dental caries', 'epidemiology', 'dental health surveys', 'dental care' and 'behavioural dental sciences'. Some new themes in 1986–1995 were 'validity' and 'dental health education'. The themes for 1996–2015 were 'quality of life', 'disparities', 'income' and 'fluoride'. The latest themes from 2016 to 2022 were 'health policy', 'inequalities', 'dental anxiety' and 'OHRQoL'.

## 4 | DISCUSSION

The journal celebrated its 50th anniversary in 2023, and the main objective of this bibliometric study was to evaluate all articles published in the journal to identify key research trends, themes, influential authors and collaboration networks.

The study findings indicate that CDOE has grown significantly in publications and citations since its foundation. CDOE publications have been globally cited, with the WHO report having the highest citation. This likely contributes to the journal's high impact

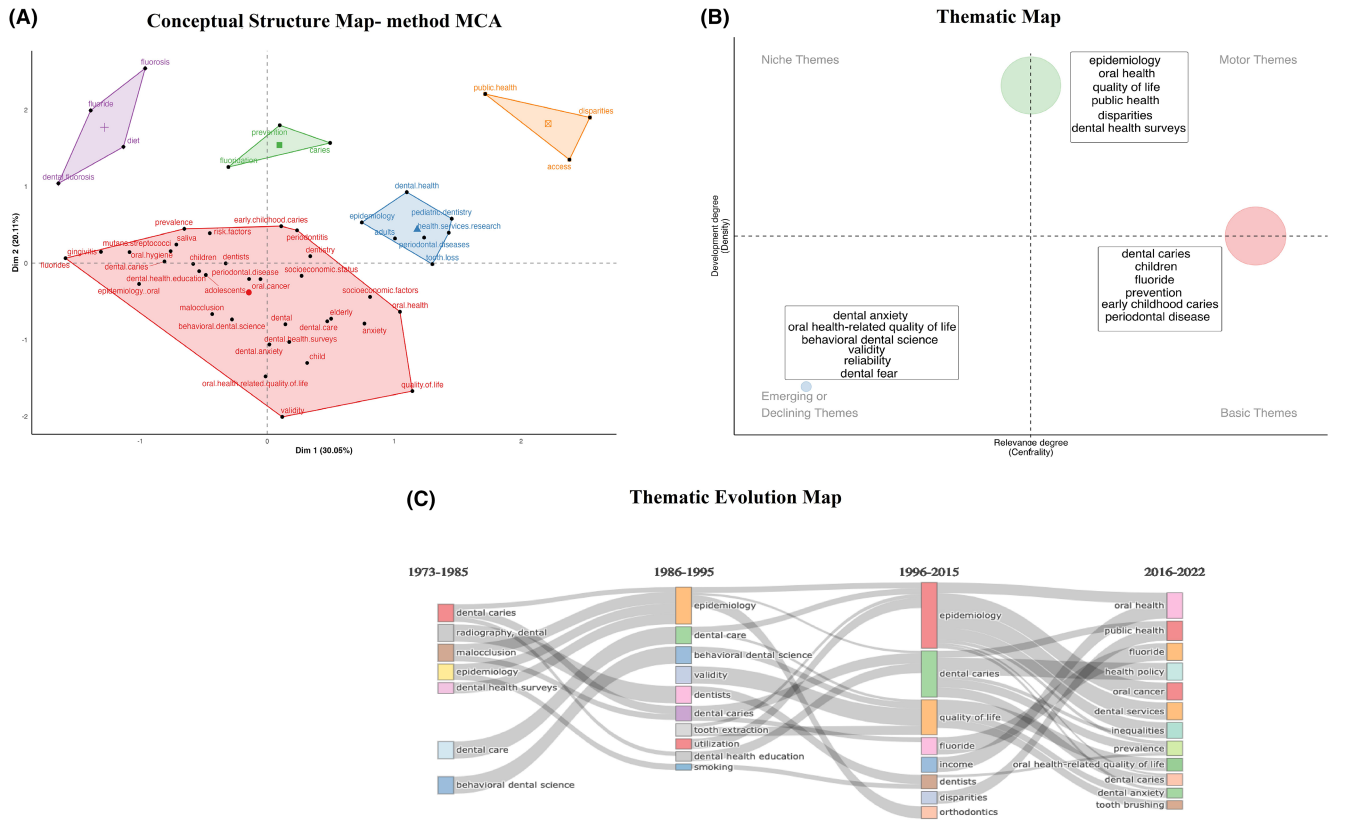


FIGURE 4 Factorial analysis. (A) Factorial analysis. The conceptual structure maps used multiple correspondence analysis to cluster a bipartile network of terms extracted from keywords. (B) Thematic map. (C) Thematic evolution map. A thematic evolution map split into five periods: 1973–1985, 1986–1995, 1996–2015 and 2016–2022.

factor, indicating its valuable contribution to international literature. In terms of citations, papers with low academic influence can still substantially impact public policy. Regarding countries, the findings show that the US and the UK were highly published, while African, South American and Asian countries were under-represented. The University of Adelaide had the highest publication count. A similar finding has been reported in other dental journals.[3,18,19] The analysis revealed that the publications were skewed and biased towards developed and English-speaking countries. This may limit the journal's impact and relevance to practitioners and researchers from those regions. This picture is more broadly reflected in the scientific [dental] literature and could be problematic for an international journal. Nevertheless, highly cited papers tend to attract attention and recognition beyond national boundaries and often include papers addressing significant research questions, innovative methodologies or innovative ideas. It is common for authors to receive citations from peers within the same country (known as the 'silo' effect); however, this becomes less likely for highly cited papers.

ECM Lo and D Locker were the most productive authors, whereas PE Petersen and AI Ismail were the most highly cited. J Rise had the highest number of articles as the first author, and the longest-publishing author was AJ Spencer. There is a potential overlap in authorship in CDOE and all DPH journals, indicating that the most productive authors in the field of DPH are also contributing to CDOE.[20] Prominent among the few female authors who contributed to CDOE were C Tsai, D Holst, S Lahti, EJ Kay, R Freeman and A Suominen, all of whom made the list of prolific authors. Gender disparities in dentistry academic publishing have been well documented, with women being underrepresented in authorship and editorial roles.[21] These disparities could stem from unconscious bias in the peer review process and structural advancement for women in academia. The appointment of Professor S Baker as the first female editor-in-chief of CDOE is a positive step towards promoting gender diversity and inclusivity. However, it is important to acknowledge that gender imbalances in academic publishing still exist and require further attention.

Keywords are widely used as tools to identify the research core topics, main research themes and content in a particular field. 'Dental caries' and 'oral epidemiology' were the journal's most researched topics. The common clusters of keywords were 'oral epidemiology' and 'risk factors', but CDOE has also been publishing on 'public health', 'access' and 'disparities'. To remain relevant and impactful in the rapidly evolving field of public dentistry, CDOE may need to broaden its scope of research themes. The underdeveloped but marginalized themes were prevention, fluoride and children. These themes represent well-defined research areas that have reached a certain level of maturity but continue to contribute to the field. The findings were similar to previous bibliometrics research in DPH journals.[20] The emerging or declining research themes were dental anxiety, OHRQL and behavioural dental science. This area represents themes either undergoing significant development or experiencing a decline in research interest. Dental anxiety is highly relevant to the global health crisis caused by the COVID-19 pandemic. Similarly, OHRQoL is increasingly recognized as a critical component of overall health and well-being and key to person-reported outcome measures in dentistry. Behavioural dental science is being increasingly rebadged as social and behavioural science, and the journal recently published a 2023 special issue based on this theme. These themes reflect a broader shift in dentistry towards a more holistic and patient-centred approach, with future research endeavours likely to have a strong and international focus on both the social and commercial determinants of oral health

Several strategies can be suggested to increase the impact and relevance of the journal: (1) facilitating the use of new and innovative research methodologies and novel statistical methods for data analysis such as data linkage machine learning and artificial intelligence; (2) seeking to expand the journal's international reach by publishing articles from a broader range of geographic locations by developing partnerships with universities and research institutions or country specific special issues to encourage submissions to the journal; (3) encouraging diversity in authorship as this can lead to a broader range of ideas and perspectives represented in the journal (4) focus research on topics that address emerging themes and interdisciplinary research and; (5) encourage and promote open access for all articles as this can increase citation rates and make research more widely available to the scientific community.

The first limitation of the analysis was that the data were from the Scopus database, which needed to be explicitly created for bibliometrics. A second limitation was using keywords and citation metrics for analysis, which may not fully capture the breadth of research and the context conducted in the field. Bibliometrics has the limitation of not recognizing the multifaceted nature of impact beyond academic citations, which is crucial in capturing the full scope of the paper's influence. Alternative metrics, such as Altmetric, offer a promising avenue to gauge the social impact of research by monitoring its presence on online platforms.

## 5 | CONCLUSION

In conclusion, this bibliometric research provides insight into CDOE's significant contribution to DPH and guides how future research in this field might be shaped. An emphasis on increased exposure and assistance for DPH-related research in African, South American and Asian countries is needed. Following trends in other health-related research, the next 50 years will hopefully yield equity in the proportion of under-represented authors, including diversity in ethnicity, gender and geographical location.

### AUTHOR CONTRIBUTIONS

Sonia Nath conceived the idea of the manuscript, conducted the statistical analysis and drafted the manuscript. Lisa M Jamieson conceived the idea of the manuscript, contributed to drafting and critically reviewed the manuscript. Sarah R Baker and William Murray

Thomson conceived the idea and critically reviewed the manuscript. All authors read and approved the final version.

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## CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

## DATA AVAILABILITY STATEMENT

The data were downloaded from the Scopus database.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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## APPENDIX A

### Methods

We used Scopus as our primary data source for bibliometric data analysis. Scopus has several advantages, such as the broader scope of coverage, providing citation data, more detailed information on each publication, a broad range of citation metrics such as h index, CiteScore and SJR (Scimago Journal Rank) and software and programmes for bibliometric analysis support data format.

The h-index, g-index, and m-index are the criteria for determining the authors with the most influence or impact. An author with an index of 'h' has written 'h' papers, each of which has been referenced at least 'h' times in other publications.[22,23] This hybrid statistic measures an author's productivity and the influence of their citations. The h-index does not consider publications that have received many citations, and it also tends to rise over time, favouring authors with longer careers.[22] Conversely, the g index gives the highly cited publication more weight.[24] The m-index is calculated by dividing the h-index by the duration of an author's active period. As a result, it is not time-dependent and considers the duration of an author's career.[22] Lotka's law is described as the number of authors against the number of contributions made. In simpler terms, it states that most authors produce only a few papers, whereas a few highly productive authors produce a significant proportion.

The thematic map was organized into four quadrants: motor, basic, specialized and emerging/declining themes. The motor themes (upper-right quadrant) are well-established and extensively studied. The motor theme represents the journal's core or fundamental concepts, theories, and methodologies. The basic theme (lower-right quadrant) represents a broader area of research that builds upon the motor theme. The topics included may be outside the field's core but continue contributing to existing knowledge. Specialized/niche theme (upper-left quadrant) are unique research areas representing a narrower topic that has emerged from basic themes. This area signifies the diversity and specialization within a field and highlights areas where research efforts have been concentrated. Emerging or vanishing themes (lower-left quadrant) represent areas of research gaining prominence and areas of future direction, trends or declining interest or relevance. It includes innovative topics, novel methodologies and represents an area of increasing interest and rapid growth. On the other hand, it could also mean previously popular and extensively researched topics, but there is a decline in research and interest.[25]

## APPENDIX B

The journal had an annual growth rate of 4.31%. The total citation received was 106225 between 1973 and 2022. The average citation received per paper was 30.9, with an average yearly citation of 2124.50. CDOE has steadily grown the total number of articles published during its 50-year history, with a substantial increase in the years 1986 (91 articles), 2012 (98 articles) and 2022 (142 articles) (Figure 1). The average is around 70 research articles annually. The average citation per year was relatively stable (Figure 1B), steadily increasing in the first 20 years. The peaks were seen in 1997, 2003 and 2007. Similarly, the average article citation per year increased over time (calculated as mean total citation per year), with peaks observed in 1997 (two-fold increase in the citation (2.61)) and 2007 (4.96) (Table S2). The significant growth in citations in proportion to publications over time reflects the journal's emphasis on creating quality rather than quantity.

## APPENDIX C

We used "locally" to define the metrics with the CDOE community of authors, i.e., CDOE authors citing other CDOE authors and publications. The most locally cited authors within the CDOE community were AJ Spencer with 61 citations, MA Peres with 37 citations, LG Do and A Sheiham with 35 citations, and HM Wong with 32 citations (Table S9). Locally, the most cited document (Table S10) was authored by Crossner CG (1981)[26] and received 16 citations on predicting caries activity based on salivary lactobacillus counts; a document by LA Heloe and O Haugejorden (1981)[27] on dental caries epidemiology received 15 citations. JM Smith and A Sheiham (1980) authored an article on dental treatment needs among the elderly population in England and received 15 citations.[28]

The most cited reference (Table S11) among CDOE authors was by Slade and Spencer (1994)[29] on developing and evaluating the oral health impact profile, which received 33 citations and was published in Community Dental Health. The publication Landis and Koch (1977)[30] authored on the measurement of observer agreement for categorical data, published in Biometrics journal, received 28 citations. A Lancet publication by Peres et al. (2019) on the global burden of oral diseases received 27 citations.[31] Internally, CDOE was

the most cited source, with 2226 articles, followed by the Journal of Dental Research (795) and Brazilian Dental Journal (694) (Table S12).

## APPENDIX D

The Sankey plot shows the association between top authors, their intuitional country and keywords (Figure S4). The Sankey plot, also known as the three-field plot, consists of rectangles of different heights and various colours used to depict the relevant elements in the diagram. A considerable information flow between a set of numbers is shown by the thickness of the connections (links). The top authors, AJ Spencer, MA Peres, LG Do, D Brennan, G Slade and Petersen, were affiliated with Universities in Australia. The United Kingdom was the second most prominent country with A Sheiham, RG Watt and G Tsakos. The most common keywords used among the authors were 'dental caries', 'oral health', 'quality of life', 'epidemiology', 'children', 'adults', 'dental care', 'dental anxiety' and 'fluoride'.

## APPENDIX E

The network results indicate several keywords, such as 'dental caries', were at the cluster's centre and connected with 'oral epidemiology', 'children', 'prevention' and 'diet'. This cluster was closely connected to the cluster with 'oral health' at the centre and associated with keywords such as 'disparities', 'public health', 'quality of life', 'dental care', 'tooth loss' and 'dental health surveys' (Figure S6).

## APPENDIX F

The evolution of research topics can be observed with a thematic evolution map. In the earlier periods (1973–1985), the prominent themes were 'dental caries', 'epidemiology' and 'dental health surveys', which highlights an emphasis on understanding disease prevalence. From 1986 to 1995, the inclusion of 'validity', 'behavioural dental science', 'epidemiology' and 'dental health education' suggests a growing emphasis on research methodology. The themes of 'quality of life', 'disparities' and 'health policy' observed in later periods reflect the increasing recognition of addressing oral health disparities. Similarly, 'OHRQoL' and 'dental anxiety' were observed in recent trends, highlighting the advances in assessment techniques and newer research areas. This may indicate a shift towards understanding patient experiences and psychological factors and approaching oral health with broader implications. The thematic maps are analysed through keywords that may not capture the full complexity of the research topic, that is, it does not provide full context or depth of the research theme. Also, the choice of keywords may vary across researchers.