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Perinatal Mortality and Social Determinants of Health: A Scopus-Based Bibliometric Analysis of Publication Patterns, Contributors, and Thematic Structure

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ABSTRACT

Introduction: This study examined publication development, prominent contributors, citation visibility, thematic clusters, and keyword temporal distribution in research on perinatal mortality and social determinants of health.

Methods: Scopus was searched without publication-year restrictions through 28 January 2026. Screening and metadata verification retained 810 documents. Biblioshiny analyzed publication performance and corresponding-author collaboration; VOSviewer mapped keyword co-occurrence and average publication years.

Results: Annual output was highest during 2023–2025. The United States and United Kingdom led corresponding-author output; single-country publications predominated among several leading countries. The London School of Hygiene and Tropical Medicine, BMC Pregnancy and Childbirth, and Steegers led affiliation, journal, and author output, respectively. Duley's article ranked highest in citations. Five clusters connected population disparities, obstetric outcomes, demographic and service characteristics, geographic surveillance, and neonatal socioeconomic contexts. Equity-related keywords had comparatively later average publication years alongside established clinical and socioeconomic terminology.

Conclusion: The corpus connects clinical vulnerability, social conditions, and healthcare delivery. Future research could examine disadvantaged populations' maternity access, neighborhood deprivation and birth outcomes, and socioeconomic differences in neonatal care. Interpretation remains bounded by Scopus coverage and bibliometric measures.

Keywords: Bibliometric Analysis; Global Health; Maternal and Neonatal Health; Perinatal Mortality; Social Determinants of Health

INTRODUCTION

Perinatal mortality encompasses fetal deaths and neonatal deaths occurring during the first week following birth (1,2). High perinatal mortality rates reflect not only clinical challenges during pregnancy and childbirth but also disparities in access to and quality of health care services. These disparities are closely linked to socioeconomic conditions, geographic location, and population vulnerability (3–5). The burden remains particularly severe in low- and middle-income countries, where resource constraints, social inequalities, and health-system limitations increase mortality risks (6,7). Although medical interventions have contributed to reductions in perinatal mortality, progress has remained uneven across regions and social groups (8,9). These persistent inequalities indicate that perinatal mortality cannot be adequately understood through clinical and obstetric perspectives alone. The social determinants of health (SDoH) framework provides a structured explanation of conditions shaping exposure, vulnerability, healthcare access, and health outcomes. The World Health Organization's framework distinguishes structural determinants from intermediary determinants operating through interconnected social and healthcare pathways (10). Structural determinants include socioeconomic and political contexts, social stratification, education, income, gender, ethnicity, and migration status. Intermediary determinants include material circumstances, psychosocial conditions, health-related behaviors, biological factors, and the accessibility and quality of healthcare services. Maternal education, socioeconomic status, housing conditions, food security, social norms, and access to quality healthcare significantly influence pregnancy and birth outcomes (11,12). Other important factors include migration status, gender inequalities, and the broader health system and public policy context affecting maternal and neonatal care (1,2). Disparities in these social determinants often exacerbate maternal and infant biological vulnerability, increasing the risk of complications and perinatal death (13). Consequently, addressing perinatal mortality requires a multidimensional approach that integrates clinical interventions with socially oriented policies promoting health equity (14,15).

Despite growing recognition of SDoH, evidence concerning their relationship with perinatal mortality remains fragmented across contextual and thematic studies (16,17). Recent studies have examined climate-related risks, ethnic disparities, healthcare access, and health-system vulnerability across particular populations and settings (18–22). Although these studies provide important contextual evidence, their focus on particular populations, exposures, or services leaves publication patterns, contributor participation, citation visibility, and thematic relationships across the wider literature insufficiently characterized. Bibliometric analysis can examine these dimensions by combining performance indicators with science mapping across a clearly defined body of literature.

Previous bibliometric studies have mapped adjacent but more narrowly defined domains within perinatal and neonatal research. Wang et al. analyzed global publications on perinatal palliative care, emphasizing research output, collaboration, and co-occurring topics (23). Dol et al. examined publication characteristics and thematic patterns in perinatal anxiety research spanning 1920 through 2020 (24). Vieira assessed neonatal-condition research in Africa, including its volume, visibility, themes, and international collaboration patterns (25). Each study addresses a specific condition, care domain, or geographic setting rather than the present combination of analytical dimensions. Integrated mapping remains limited for research connecting perinatal mortality with its clinical, demographic, socioeconomic, structural, and health-system determinants. This gap concerns the combined examination of publication development, corresponding authorship, productive contributors, citation visibility, and keyword-based thematic structures.

This study maps Scopus-indexed research on perinatal mortality and SDoH using records retrieved through 28 January 2026. It examines annual publication output, corresponding-author country patterns, productive contributors, citation visibility, and keyword-based thematic structures. The empirical keyword clusters are interpreted through the SDoH framework but are not treated as validated conceptual domains. The temporal analysis compares average publication years without assuming that comparatively recent themes displaced established clinical or demographic perspectives. The findings may inform research collaboration and agenda development within the boundaries of the defined Scopus-based dataset. The study is guided by three research questions aligned with its performance and science-mapping components.

How did the annual publication output of Scopus-indexed research on perinatal mortality and social determinants of health develop through 28 January 2026?

Which corresponding-author countries, affiliations, journal sources, authors, and documents were most prominent within the final analytical dataset on perinatal mortality and social determinants of health?

What thematic clusters were identified through keyword co-occurrence, and how were keywords distributed temporally according to their average publication years?

METHODS

Research Design

This study used bibliometric analysis to examine Scopus-indexed research connecting perinatal mortality with social determinants of health. Bibliometric analysis enabled the systematic and quantitative examination of publication characteristics, scientific influence, collaboration patterns, and the conceptual structure of the research field. The analysis combined performance indicators with science mapping to examine publication output, citation influence, geographic and institutional contributions, scientific collaboration, and thematic development over time (26,27). Together, these components provided a structured description of prominent contributors, collaboration patterns, citation visibility, and thematic relationships within the defined literature corpus.

Search Strategy

Data were retrieved from the Scopus database on 28 January 2026, with no publication-year restriction. The retrieval covered records indexed from database inception until the search date. Two documents published between 1 and 28 January 2026 were included in the retrieved records. Scopus was selected because of its broad coverage of international scholarly sources, curated bibliographic content, comprehensive metadata, and extensive use in cross-disciplinary bibliometric research (28). The database provides structured metadata on authors, affiliations, sources, citation counts, keywords, abstracts, and other publication characteristics required for bibliometric analysis.

The search strategy combined terms representing perinatal mortality with terms related to social determinants, socioeconomic factors, inequality, and inequity. The query was applied to the Scopus title, abstract, and keyword fields to retrieve records containing both conceptual components. The complete Scopus syntax used for the unrestricted search was as follows: TITLE-ABS-KEY (“perinatal mortality” OR “perinatal death*” OR “perinatal mortality rate” OR “perinatal mortality ratio”) AND (“social determinant*” OR “socioeconomic factor*” OR inequality OR inequity).

No restrictions were applied by language, country, subject area, or source type during the initial search. Document-type filtering was conducted after retrieval, and eligible records were limited to articles, reviews, and conference papers. Conference papers were retained because they represent indexed scholarly communication that may contribute to the development and dissemination of research themes. All other document types were excluded. The query operationalized the study’s focus on publications explicitly connecting perinatal mortality with social, economic, structural, or inequality-related concepts. The resulting corpus represents records identified through these specified terms rather than an exhaustive census of every related perinatal publication.

Data Collection and Selection Criteria

The initial unrestricted Scopus search retrieved 855 records, including two records published during the partial 2026 publication year. Duplicate records were assessed using Scopus EIDs and DOIs, followed by exact-title and author-year comparisons. No duplicate records were identified, and all 855 records proceeded to document-type screening. Document-type screening excluded 40 records and retained 815 records that met the predefined selection criteria. The retained records comprised 722 articles, 83 review articles, and 10 conference papers. No additional title-and-abstract screening was conducted because record selection was operationalized through the database query and predefined document-type criteria. Records classified as notes, letters, editorials, short surveys, book chapters, errata, or books were excluded because these categories fell outside the predefined eligible document types. The 815 retained records were exported in comma-separated values (CSV) format for metadata verification and subsequent bibliometric analysis. Metadata verification examined the completeness and internal consistency of Scopus EIDs, DOIs, titles, publication years, source titles, document types, author names, affiliations, and author keywords. Manual inspection identified five records lacking author-name, affiliation, and author-keyword metadata, which prevented reliable contributor, collaboration, and keyword-based analyses. These records were removed before data import to maintain one consistent corpus across all performance and science-mapping procedures. The final analytical dataset comprised 810 documents, including two documents published by the retrieval date during 2026.

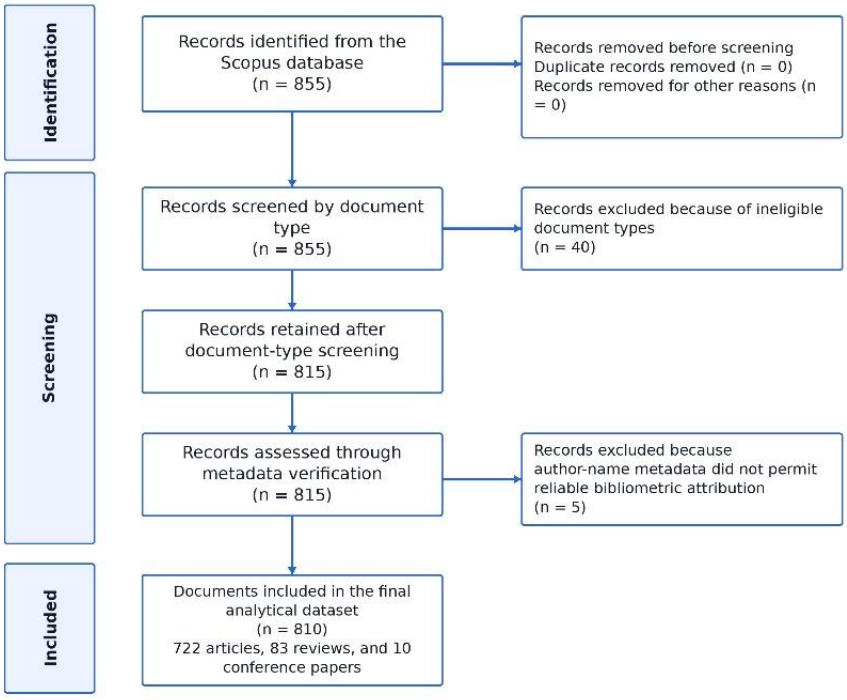


Figure 1. Bibliometric Record Selection and Metadata Filtering Process

The quality-control sequence therefore comprised duplicate assessment, document-type screening, metadata verification, and removal of records that could not support consistent bibliometric attribution. Figure 1 presents the record-selection and metadata-filtering process from database retrieval to the final analytical dataset. Its three-stage organization was adapted from the PRISMA 2020 flow diagram developed by Page et al. to support transparent reporting (29). This adaptation does not indicate that the bibliometric study was conducted or reported as a PRISMA systematic review.

Data Analysis

Bibliometric analyses were conducted using Biblioshiny, the web interface for Bibliometrix version 5.4.1 running in R version 4.5.1, and VOSviewer version 1.6.20. These complementary tools were selected because their functions support reproducible performance analysis and science mapping in bibliometric research (30,31). Biblioshiny was used for performance analysis of annual publication output, corresponding-author countries, author affiliations, journal sources, productive authors, and influential documents based on citation counts. VOSviewer was used exclusively for keyword co-occurrence mapping and visualization of thematic clusters and their temporal distribution. Country-level output was assigned according to the corresponding author's country as recorded and processed through Biblioshiny. Single-country publications involved authorship within the corresponding author's country, whereas multiple-country publications included authorship affiliations from at least one additional country. These indicators describe collaboration from the corresponding-author country perspective and do not represent a complete country-level coauthorship network. Potential naming variants among leading authors and affiliations were compared with Scopus metadata and associated publication records. Unambiguous variants representing the same contributor or institution were consolidated, while uncertain identities remained separate.

Before constructing the co-occurrence network, a two-column VOSviewer thesaurus was prepared to standardize terminology and document keyword exclusions. The first column, "label", contained each source term, while the second column, "replace by", provided its preferred standardized label. Spelling variants, singular and plural forms, abbreviations, and synonymous expressions were consolidated under representative terms. Terms designated for exclusion were entered with blank replacement fields, following the format required by VOSviewer. Generic indexing terms, study-design terminology, and country names were excluded because they did not represent the conceptual themes examined. Country names were excluded because geographic contributions were analyzed separately through corresponding-author country indicators in Biblioshiny. The completed thesaurus contained 374 processing decisions, comprising 147 standardized replacements and 227 exclusions. VOSviewer applied the thesaurus before occurrence-threshold selection and construction of the final co-occurrence network. After thesaurus processing, 3,800 keywords remained, of which 453 met the minimum threshold of five occurrences.

Co-occurrence analysis used all keywords as the unit of analysis and full counting as the counting method. The network was normalized using the association strength method described by Eck and Waltman (32). Default layout parameters were retained, with an attraction value of 2 and a repulsion value of 0. Clustering used a resolution of 1.00, a minimum cluster size of one, and the enabled option for merging small clusters. The resulting network contained 453 items across five clusters, with 35,328 links and a total link strength of 137,944. Network visualization displayed keyword relationships and cluster membership, while node size represented the occurrence frequency of each keyword. Overlay visualization displayed temporal positioning according to each keyword's average publication year rather than longitudinal thematic replacement. The overlay visualization used a manually specified 2005–2025 color scale, while the actual average publication years of the retained keywords ranged from 1972.00 to 2024.20. Occurrence frequencies and average publication years for selected keywords, the complete thesaurus documenting replacements and exclusions, and the final keyword map export were generated as analysis outputs.

Citation counts used to identify influential documents reflected the values recorded in Scopus on the retrieval date of 28 January 2026. Total citations per year (TC/year) were calculated by dividing total citations by inclusive document age, defined as 2026 minus publication year plus one. This calculation assigned a document age of one year to publications from 2026. Although the final dataset included two documents published in 2026, the annual publication trend was interpreted through 2025 because the 2026 data covered only the period ending 28 January. The two 2026 documents were retained in the performance and thematic analyses, but their partial-year count was not interpreted as evidence of declining annual publication output.

The thematic interpretation was based on the co-occurrence network, cluster structure, keyword frequency, link patterns, and temporal distribution generated through VOSviewer. These outputs were interpreted in relation to the research questions and relevant scientific literature concerning perinatal mortality and the SDoH. Cluster labels were assigned after examining the most frequent, strongly connected, and conceptually related keywords within each empirically generated cluster. The SDoH framework guided the subsequent conceptual interpretation but did not predetermine or validate the empirically generated keyword clusters. Two additional authors reviewed the proposed cluster labels and thematic interpretations by comparing them with the most frequent and strongly connected keywords within each cluster. Any differences in interpretation were discussed until consensus was reached.

Ethical Approval

This bibliometric study analyzed secondary bibliographic metadata retrieved from Scopus through authorized institutional access on 28 January 2026. The study did not involve human participants, biological specimens, experimental interventions, or identifiable personal or sensitive information. Because the analysis was limited to publication metadata, ethics committee

approval and informed consent were not required. All bibliographic records were handled responsibly, and the underlying publications were cited in accordance with established scholarly and research integrity principles.

RESULTS

Annual Publication Output of Research on Perinatal Mortality and Social Determinants of Health

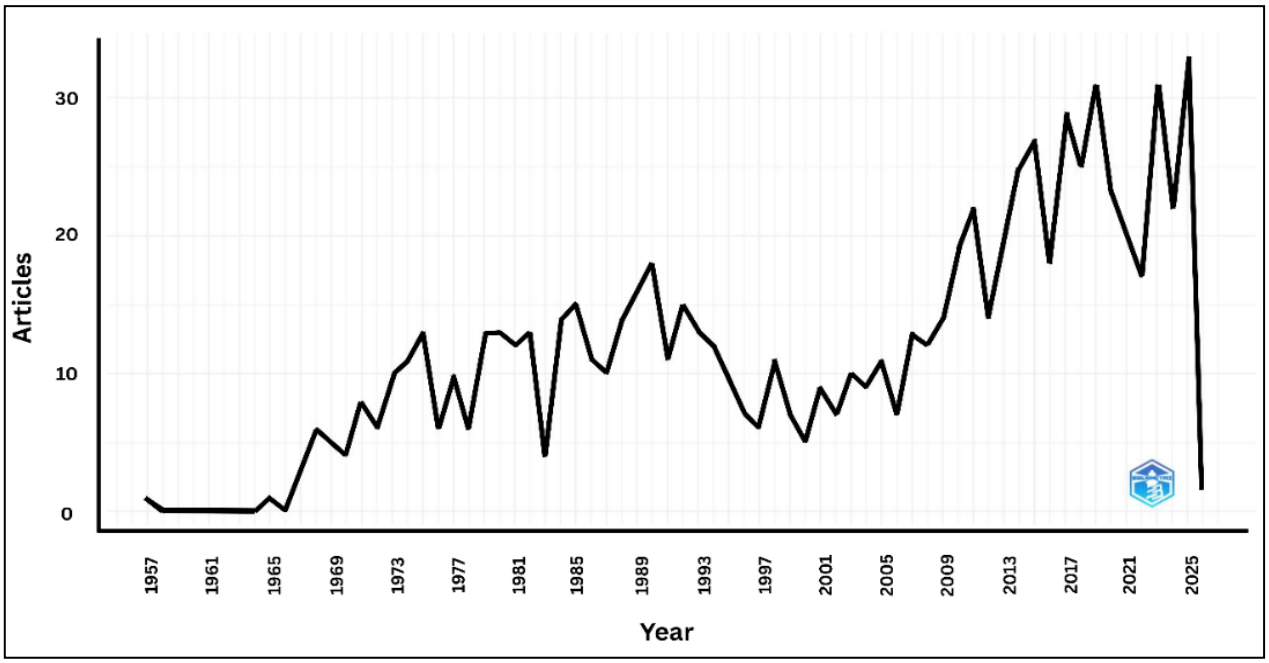


Figure 1. Annual Scientific Production in Research on Perinatal Mortality and Its Social Determinants of Health

Figure 1 shows that publication output on perinatal mortality and SDoH developed gradually and unevenly across the period covered by Scopus. The earliest documents appeared in 1957, followed by several years without indexed publications. Annual output increased slowly from the late 1960s through the early 1970s and fluctuated during the 1990s and early 2000s. A more consistent upward pattern emerged after 2008, with publication output reaching its highest levels between 2023 and 2025. Two documents published in 2026 had been indexed by the retrieval date of 28 January 2026. Because these documents represented only a partial publication year, they were retained in the dataset but were not interpreted as evidence of declining annual output. The observed counts describe publication development within the defined Scopus dataset and do not represent a statistically tested temporal trend.

Prominent Contributors, Corresponding-Author Collaboration, and Citation Visibility

Figure 2 presents publication output and collaboration patterns among the ten leading corresponding-author countries within the final analytical dataset.

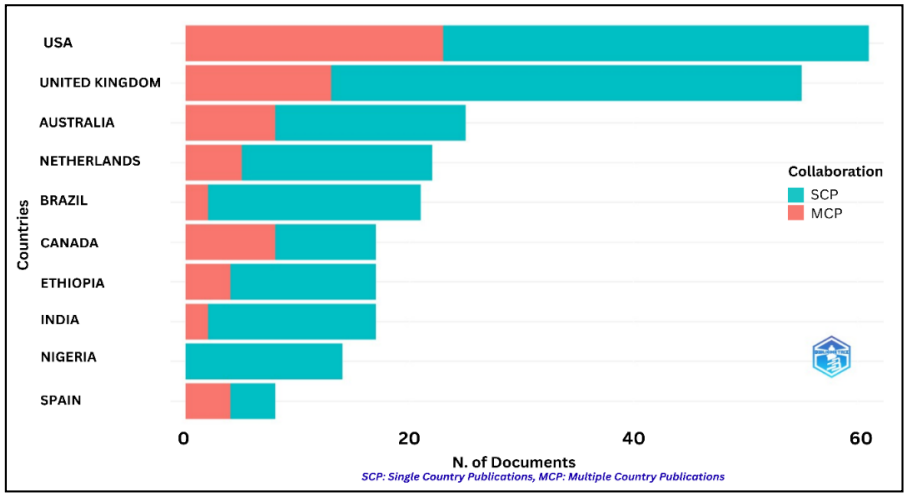


Figure 2. Top 10 Corresponding Author Countries by Publication Output in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Figure 2 shows that the United States ranked first with 60 documents, with single-country publications more frequent than multiple-country publications. The United Kingdom ranked second and also showed predominantly single-country publication output, although approximately one-quarter of its documents involved international collaboration. Australia and the Netherlands followed, with single-country publications remaining more frequent than multiple-country publications in both countries. These rankings represent publication output assigned by corresponding-author country within the retrieved corpus and were not interpreted as a comprehensive account of national research production.

Brazil was the leading corresponding-author country from Latin America, with most of its publications classified as single-country publications. Canada recorded fewer documents than the other leading Anglophone countries but showed a comparatively balanced distribution between single-country and multiple-country publications. Ethiopia, India, and Nigeria also contributed to the field, although their publication output was predominantly classified as single-country publications. Spain completed the top ten, with both domestic and internationally collaborative publications represented. The balance between single-country and multiple-country publications differed across the ten corresponding-author countries. However, these categories reflect affiliations associated with corresponding-author publications and do not constitute a complete country-level coauthorship network.

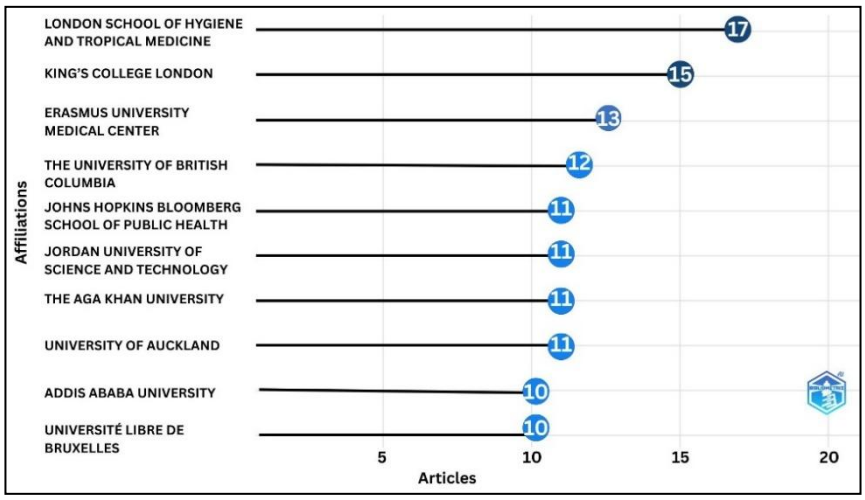


Figure 3. Top 10 Author Affiliations by Publication Output in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Figure 3 presents the most productive affiliations in research on perinatal mortality and SDoH. The London School of Hygiene and Tropical Medicine ranked first with 17 publications, followed by King's College London with 15. Erasmus University Medical Center ranked third with 13 publications, followed by the University of British Columbia with 12 publications. Johns Hopkins Bloomberg School of Public Health produced 11 publications.

Jordan University of Science and Technology, Aga Khan University, and the University of Auckland each contributed 11 documents. Addis Ababa University and Université Libre de Bruxelles completed the top ten with 10 documents each. The listed affiliations were located across Europe, North America, Asia, Africa, and Oceania. These rankings represent publication counts after the verification and consolidation of unambiguous affiliation-name variants. Figure 4 presents the journal sources with the largest numbers of documents in the field.

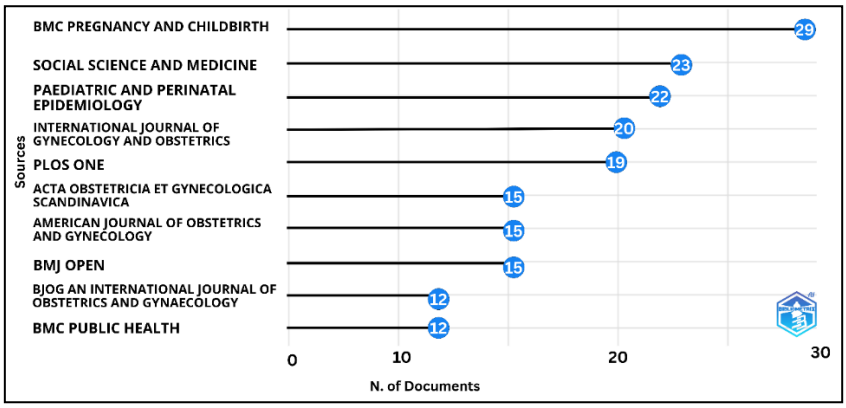


Figure 4. Top 10 Journal Sources by Publication Output in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Figure 4 shows that *BMC Pregnancy and Childbirth* was the most productive journal source, with 29 documents. It was followed by Social Science & Medicine with 23 documents and *Paediatric and Perinatal Epidemiology* with 22. The *International Journal of Gynecology and Obstetrics* and *PLoS One* published 20 and 19 documents, respectively. *Acta Obstetricia et Gynecologica Scandinavica*, the *American Journal of Obstetrics and Gynecology,* and *BMJ Open* each

published 15 documents. *BJOG: An International Journal of Obstetrics and Gynaecology* and *BMC Public Health* completed the list with 12 documents each. The represented publication outlets covered obstetrics, maternal and child health, epidemiology, public health, social science, and multidisciplinary research. Figure 5 presents the authors with the highest publication output.

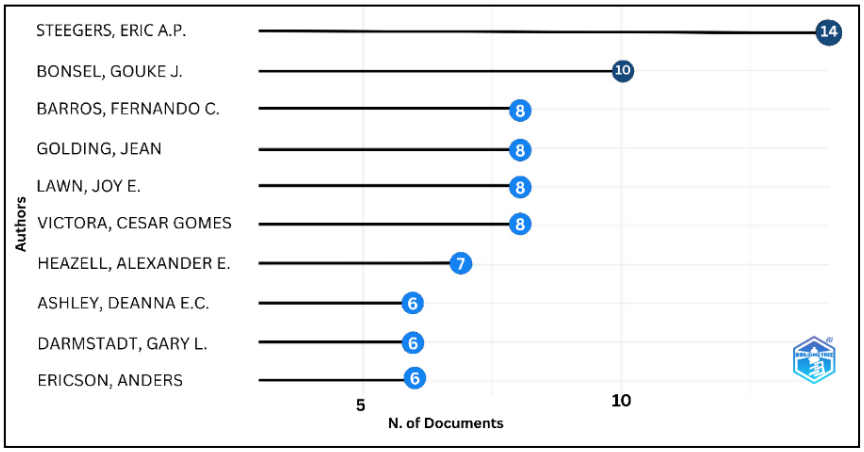


Figure 5. Top 10 Authors by Publication Output in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Figure 5 shows that Steegers was the most productive author, with 14 documents, followed by Bonsel with 10. Barros, Golding, Lawn, and Victora each contributed eight documents, while Heazell contributed seven. Ashley, Darmstadt, and Ericson each contributed six documents. These results identify the authors with the highest publication output in the analyzed dataset. Table 1 presents the ten documents with the highest total citation counts.

Table 1. Top 10 Documents by Total Citations in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Paper	DOI	Total Citations	TC/year
Duley L, 2009, Semin Perinatol	10.1053/j.semperi.2009.02.010	2170	120.56
Lumley J, 2009, Cochrane Database Syst Rev	10.1002/14651858.CD001055.pub3	535	29.72
Flenady V, 2016, Lancet	10.1016/S0140-6736(15)01020-X	519	47.18
Lawn JE, 2009, Int J Gynecol Obstet	10.1016/j.ijgo.2009.07.016	424	23.56
Fretts RC, 2005, Am J Obstet Gynecol	10.1016/j.ajog.2005.03.074	364	16.55
Rantakallio P, 1969, Acta Paediatr Scand	-	325	5.60
Bilano VL, 2014, PLoS One	10.1371/journal.pone.0091198	286	22.00
Sobhy S, 2019, Lancet	10.1016/S0140-6736(18)32386-9	276	34.50
Bollini P, 1995, Soc Sci Med	10.1016/0277-9536(94)00386-8	247	7.72
de Jonge A, 2009, BJOG	10.1111/j.1471-0528.2009.02175.x	245	13.61

Note. Citation counts were retrieved from Scopus on 28 January 2026. TC/year represents total citations divided by inclusive document age, calculated as 2026 minus publication year plus one. These indicators describe citation visibility within Scopus rather than the methodological quality of the cited documents.

Table 1 shows that Duley's 2009 article in *Seminars in Perinatology* ranked first with 2,170 total citations and 120.56 citations per year (33). The systematic review by Lumley et al. (2009) in the *Cochrane Database of Systematic Reviews* ranked second with 535 citations and 29.72 citations per year (34). Flenady et al.'s 2016 article in *The Lancet* received 519 citations and had an annualized citation rate of 47.18 (4). Lawn et al.'s 2009 article and Fretts' 2005 article completed the five most cited documents, receiving 424 and 364 citations, respectively (2,35).

The 1969 article by Rantakallio was the earliest publication among the ten most cited documents and received 325 citations (36). Bilano et al. (37) and Sobhy et al. (5) received 286 and 276 citations, respectively. Their annualized citation rates were 22.00 and 34.50 citations per year. Bollini and Siem's 1995 article (3) received 247 citations, while de Jonge et al.'s 2009 article (38) received 245. Collectively, the ten most cited documents addressed clinical risks, preventive interventions, social inequalities, and healthcare factors associated with perinatal outcomes.

Thematic Structure and Temporal Dynamics of Research on Perinatal Mortality and Social Determinants of Health

Figure 6 presents five clusters identified through keyword co-occurrence network visualization. The final network contained 453 keyword items, 35,328 links, and a total link strength of 137,944. Node size represents occurrence frequency, whereas connecting lines indicate co-occurrence relationships among keywords. Cluster colors indicate VOSviewer-generated

membership rather than categories predetermined through the SDoH framework. The five clusters contained 161, 159, 85, 25, and 23 keyword items, respectively. The descriptive labels summarize the most frequent, strongly connected, and conceptually related keywords within each empirically generated cluster.

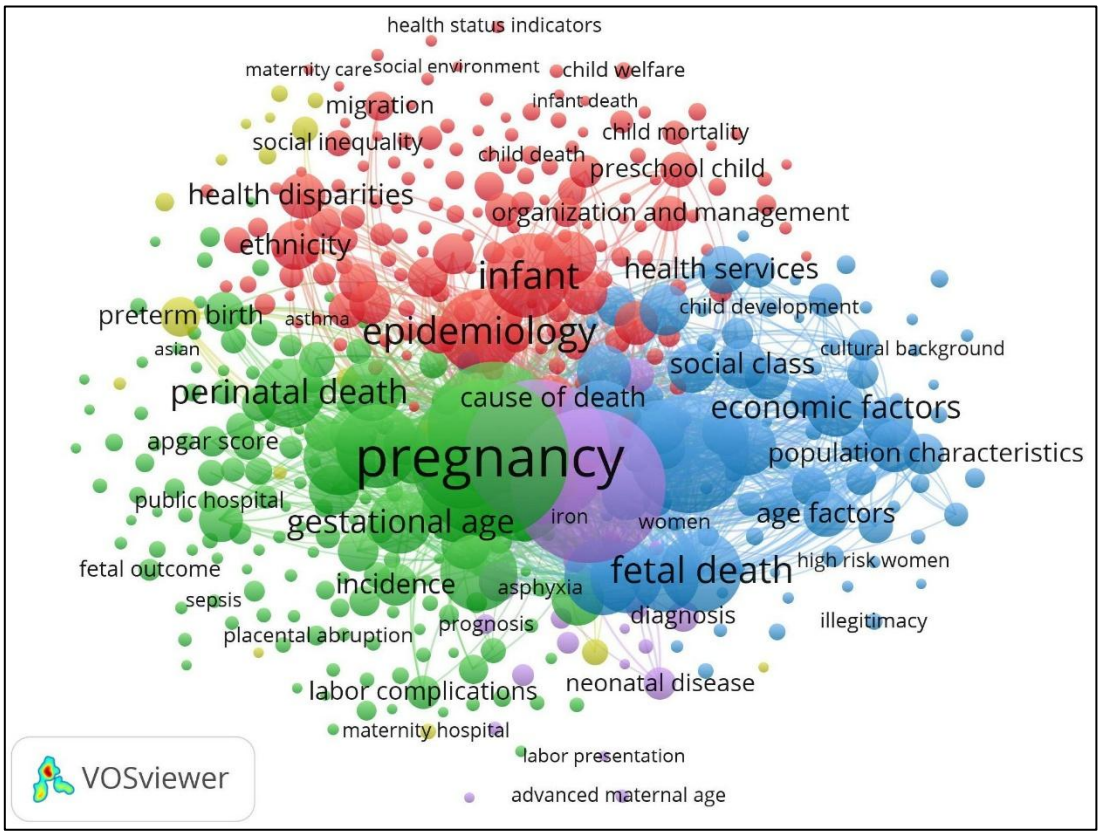


Figure 6. Keyword Co-Occurrence Clusters in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Cluster 1, shown in red, comprised 161 items and represented population health, social disparities, and maternal and child healthcare. Prominent keywords included “epidemiology”, “infant”, “child”, “mother”, “health disparities”, “ethnicity”, “poverty”, “public health”, and “healthcare access”. Connected terms included “maternal care”, “perinatal care”, “health policy”, “health system”, “migration”, “social inequality”, and “organization and management”. Cluster 2, shown in green, comprised 159 items and represented pregnancy, obstetric conditions, and perinatal outcomes. Its prominent keywords included “pregnancy”, “perinatal mortality”, “pregnancy outcome”, “perinatal death”, “pregnancy complications”, “gestational age”, and “stillbirth”. Additional terms included “maternal mortality”, “neonatal death”, “prematurity”, “preterm labor”, “preeclampsia”, “cesarean section”, and “maternal morbidity”.

Cluster 3, shown in blue, comprised 85 items and represented demographic, socioeconomic, and healthcare-service characteristics. Prominent keywords included “infant mortality”, “fetal death”, “maternal age”, “parity”, “demography”, “economic factors”, and “socioeconomic status”. Connected terms included “social class”, “population dynamics”, “demographic factors”, “geographic distribution”, “health services”, and “maternal health services”. Their co-occurrence connected mortality patterns and reproductive characteristics with population structure, socioeconomic circumstances, and healthcare-service contexts.

Cluster 4, shown in yellow, comprised 25 items and represented birth outcomes, geographic conditions, and population-based health surveillance. Its prominent keywords included “low birth weight”, “preterm birth”, “childbirth”, “residence characteristics”, “neighborhood”, “poverty areas”, and “health inequalities”. Related terms included “registries”, “birth certificate”, “death certificate”, “hospital”, “maternity hospital”, and “perinatal health”. Cluster 5, shown in purple, comprised 23 items and represented neonatal conditions and socioeconomic circumstances. Its prominent keywords included “newborn”, “socioeconomic factors”, “congenital malformation”, “neonatal disease”, “diagnosis”, and “labor, obstetric”. Additional terms included “pregnancy complications, infectious”, “pregnancy complications, hematologic”, “sex factors”, and “urban population”.

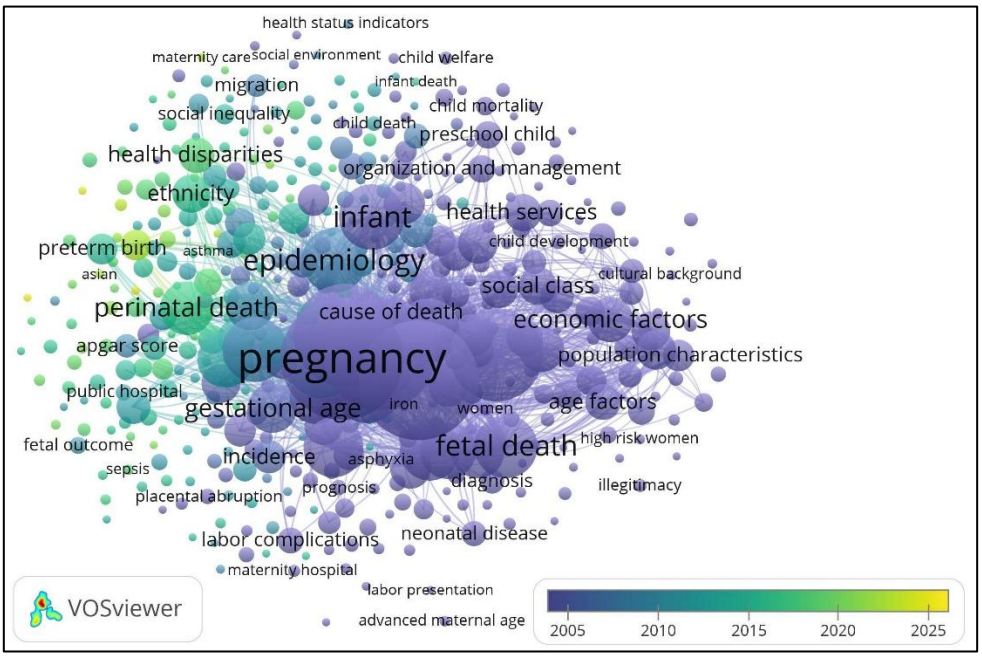


Figure 7. Temporal Distribution of Keywords by Average Publication Year in Scopus-Indexed Research on Perinatal Mortality and Social Determinants of Health

Figure 7 presents the temporal distribution of keywords according to their average publication years within the analyzed corpus. The visualization used a 2005–2025 color scale, although the actual average publication years ranged from 1972.00 to 2024.20. Keywords with averages before 2005 included pregnancy (2002.23), infant mortality (1994.13), maternal age (1997.77), and parity (1993.79). Epidemiology and migration averaged 2008.44 and 2008.52, respectively, while very low birth weight had an average publication year of 2009.43. Social inequality and health care access averaged 2013.68 and 2013.83, respectively, followed by neonatal intensive care (2014.24) and maternal smoking (2014.75).

Comparatively later averages characterized health disparities (2018.06), health equity (2019.40), global health (2020.25), and sustainable development (2020.50). Social determinants of health occurred in 54 documents and averaged 2021.74, while maternity care occurred in five documents and averaged 2021.40. High-income countries occurred in ten documents and averaged 2022.20, whereas economic inequality occurred in five documents and averaged 2024.20. Economic inequality had the latest average publication year, while social determinants of health appeared in a larger number of documents. Occurrence frequencies and average publication years for selected keywords were retained as analysis outputs.

DISCUSSION

Annual Publication Output of Research on Perinatal Mortality and Social Determinants of Health

The annual publication pattern indicates that research connecting perinatal mortality with SDoH developed gradually and unevenly. Following intermittent output during earlier decades, annual counts became more consistently elevated after 2008 and reached their highest levels between 2023 and 2025. This development suggests increasing publication activity within the literature captured by the specified Scopus query. The two documents indexed by 28 January 2026 represent partial-year coverage and therefore provide limited information about annual output during 2026. Interpretation of publication development consequently centers on completed years through 2025, consistent with the study's first research question.

The higher publication counts after 2015 coincided with international attention to maternal and newborn health within broader development agendas. This correspondence offers contextual background, while the annual counts themselves provide descriptive evidence of publication activity. Research concerning maternal social determinants in Mexico illustrates the continuing relevance of socioeconomic inequalities to perinatal mortality (9). Related literature on climate change and preterm birth extends this context toward environmental conditions surrounding pregnancy and birth (19). Together, these studies contextualize the recent publication activity without establishing the causes of its observed development.

Prominent Contributors, Corresponding-Author Collaboration, and Citation Visibility

The country analysis identified the United States and the United Kingdom as the leading corresponding-author countries, followed by Australia and the Netherlands. These rankings describe research participation through corresponding-author affiliations within the retrieved corpus, providing a specific perspective on the geographic distribution of publications. The prominence of these countries places research from comparatively well-resourced settings among the most visible contributions to the selected literature. Nevertheless, low national mortality rates can coexist with substantial inequalities among population groups, sustaining the relevance of socially oriented perinatal research (4).

Single-country publications exceeded multiple-country publications across several leading corresponding-author countries, whereas Canada displayed a comparatively balanced distribution between these categories. Brazil, Ethiopia, India, and Nigeria also appeared among the leading contributors, with predominantly single-country publication output. Brazilian research examined neonatal near-miss conditions and mortality across public maternity hospitals, contributing a clinical and

service-related perspective (39). Another Brazilian study investigated spatial concentrations of adolescent pregnancies and neonatal deaths alongside socioeconomic characteristics in São Paulo (40). Ethiopian studies examined community-based determinants of perinatal mortality and factors associated with early neonatal death (41,42). Research from vulnerable urban settlements in Nigeria highlighted subnational maternal and child mortality inequalities obscured by aggregated indicators (43). These studies illustrate contextual diversity, while the distribution of single-country and multiple-country publications reflects international affiliations associated with publications assigned to each corresponding-author country.

These contextual differences can be considered through the maternal mortality, stillbirth, and neonatal mortality transition model proposed by Boerma et al. (1). The model relates mortality reduction to changes in health-system capacity, service coverage, and social conditions, providing context for differences in research emphasis. Dutch research examined geographic differences in perinatal health, while Spanish research investigated sociodemographic variation in preterm birth and low birth weight (44,45). Research from London further examined continuity of midwifery care within an area experiencing substantial socioeconomic disadvantage (46). These examples illustrate continuing concerns about geographic inequality, population disadvantage, and maternity services across different settings, without assigning the ranked countries to transition stages.

At the institutional level, the London School of Hygiene and Tropical Medicine recorded the highest output, followed by King's College London and Erasmus University Medical Center. Leading affiliations were distributed across Europe, North America, Asia, Africa, and Oceania, extending the institutional landscape beyond the highest-ranking corresponding-author countries. Research on targeted health and social care interventions illustrates the attention given to disadvantaged populations within this literature (47). Studies of neighborhood deprivation and geographic differences in perinatal health further illustrate its spatial and health-system perspectives (44,48). These research areas provide substantive context for institutional productivity and connect with the social and service-related themes identified in the keyword network.

The journal distribution demonstrates that the retrieved literature spans obstetrics, epidemiology, public health, social science, and multidisciplinary scholarship. BMC Pregnancy and Childbirth recorded the largest publication output, followed by Social Science & Medicine and Paediatric and Perinatal Epidemiology. Studies in BMC Pregnancy and Childbirth examined hospital-based perinatal mortality and disparities in ambulance-service access during pregnancy, childbirth, and the postpartum period (49,50). Social Science & Medicine included research concerning undocumented migrants and socioeconomic deprivation in relation to perinatal outcomes (16,51). Paediatric and Perinatal Epidemiology contributed evidence concerning interpregnancy intervals and maternal and child health transitions (52,53). These outlets provide complementary venues for disseminating clinical, social, and healthcare-service research to different scholarly audiences.

Within this interdisciplinary landscape, Steegers and Bonsel recorded the highest author-level publication outputs, identifying them as frequent contributors within the analyzed corpus. Their publications examined perinatal inequalities and socioeconomic deprivation among urban populations, connecting maternal health with broader social conditions (16,54). Related work investigated neighborhood differences in perinatal morbidity and mortality across Dutch municipalities, adding a geographic perspective to these contributions (55). Barros and Victora contributed Brazilian cohort research concerning maternal and child health transitions and risk factors for perinatal mortality (53,56). Lawn and Darmstadt also appeared among the leading contributors, with joint research addressing intrapartum-related stillbirths and neonatal deaths (2). These contributions illustrate complementary epidemiological, social, and clinical perspectives, while document-level citation rankings indicate the accumulated visibility of individual publications.

Duley's article recorded the highest total and annualized citation counts, highlighting the visibility of hypertensive disorders within the retrieved literature (33). Highly cited research also addressed smoking cessation during pregnancy, stillbirth prevention, and intrapartum-related deaths (2,4,34). Earlier publications contributed population-risk and migrant-health perspectives, demonstrating the longstanding presence of demographic and social concerns (3,36). Other prominent documents examined stillbirth prevention, hypertensive complications, and mortality associated with cesarean delivery (5,35,37). Research comparing planned home and hospital births added a service-related perspective to this citation landscape (38). Total citations indicate accumulated scholarly visibility, whereas annualized counts place that accumulation in relation to publication age. Together, these indicators complement publication productivity, with their interpretation remaining sensitive to database coverage and differences in citation practices.

Thematic Structure and Temporal Dynamics of Research on Perinatal Mortality and Social Determinants of Health

The keyword network identified five clusters connecting population health, obstetric conditions, demographic characteristics, socioeconomic circumstances, geographic contexts, and healthcare services. Clusters 1 and 2 contained 161 and 159 items, respectively, making them the largest groupings by keyword membership. Their size reflects the number of keyword items assigned to each cluster rather than their comparative scientific importance. The SDoH framework guided subsequent interpretation of these empirically generated groupings, connecting the science-mapping findings with the conceptual perspective introduced earlier.

Cluster 1 brought together population health, social disparities, and maternal and child healthcare through poverty, ethnicity, migration, inequality, and healthcare-access terminology. This grouping places social conditions and service organization within a shared thematic context. Research concerning undocumented migrants and maternal social determinants provides substantive examples of the concerns represented by these keywords (9,51). Cluster 2 connected pregnancy and obstetric conditions with stillbirth, prematurity, preeclampsia, maternal morbidity, and neonatal death. Its composition reflects the continuing clinical foundations of the field, contextualized by literature on hypertensive disorders and stillbirth prevention (4,33). Together, these clusters illustrate the coexistence of clinical and socially oriented terminology within the retrieved literature.

Cluster 3 connected demographic and socioeconomic characteristics with mortality outcomes and healthcare services through maternal age, parity, social class, and geographic distribution terminology. The co-occurrence pattern links reproductive characteristics and population conditions with economic circumstances and healthcare-service terminology within the retrieved literature. Within the SDoH framework, this grouping spans social stratification and intermediary conditions surrounding maternal and newborn health. Its contribution to the thematic map lies in linking population characteristics with the social and service contexts represented elsewhere in the network.

Cluster 4 connected low birth weight and preterm birth with neighborhood conditions, poverty areas, healthcare facilities, registries, and vital records. This composition identifies a thematic grouping concerned with geographic context and population-based documentation of birth outcomes. Research examining neighborhood deprivation and geographic differences in perinatal health provides relevant context for this interpretation (44,48). Cluster 5 connected neonatal diseases and congenital conditions with maternal complications, demographic characteristics, and socioeconomic factors. Its 23 items represent neonatal conditions within a broader clinical and social context, complementing the population and service perspectives of the other clusters.

The temporal distribution shows comparatively later average publication years for explicit equity-related terminology alongside earlier clinical, demographic, and socioeconomic vocabulary. Health disparities and health equity averaged 2018.06 and 2019.40, respectively, whereas social determinants of health and economic inequality averaged 2021.74 and 2024.20. Social determinants of health occurred in 54 documents, compared with five documents containing economic inequality, indicating different publication frequencies underlying their temporal positions. The later average for economic inequality therefore reflects more recent usage within a smaller publication base rather than greater thematic prominence. Research concerning social deprivation and migrant populations provides substantive context for the equity-related vocabulary represented in the overlay (16,51). Related literature also documents persistent stillbirth inequalities in high-income settings, illustrating the continuing relevance of equity concerns across different healthcare contexts (4).

The comparatively recent positioning of explicit SDoH terminology coexists with longstanding attention to socioeconomic conditions in perinatal research. Recent studies examined maternal social vulnerability in Mexico and individual and contextual determinants of perinatal mortality in East Africa (9,57). Earlier Swedish research examined housing conditions, socioeconomic indicators, maternal age, parity, and infant survival, demonstrating that these concerns preceded contemporary SDoH terminology (58). Literature on intrapartum-related deaths also connected mortality with poverty and limited access to skilled childbirth care (2). The overlay therefore suggests continuity between established socioeconomic concerns and more explicit equity-related vocabulary in comparatively recent publications. Clinical and service-related terms displayed varied temporal positions, including very low birth weight (2009.43), neonatal intensive care (2014.24), and maternity care (2021.40).

Together, the network and overlay findings describe interconnected clinical, demographic, social, geographic, and healthcare-service themes within the retrieved literature. The SDoH framework provides an interpretive perspective through structural determinants and intermediary conditions surrounding maternal and newborn health (10). The Mexican study illustrates these complementary perspectives by examining clinical conditions alongside social vulnerability in relation to perinatal mortality (9). The East African analysis similarly considered maternal and reproductive characteristics alongside education, household wealth, insurance coverage, residence, and national contextual conditions (57). These examples contextualize the thematic connections, while the temporal findings indicate differences in the average publication years associated with related research vocabularies.

Implications for Research and Public Health Agenda Development

The thematic findings suggest three focused directions for future research connecting clinical vulnerability with social conditions and healthcare delivery. First, Clusters 1 and 3 suggest examining socioeconomic disadvantage and migration status in relation to delayed maternity care and perinatal outcomes. Longitudinal and multilevel studies could investigate antenatal access, referral timeliness, and continuity of care among migrant women and disadvantaged populations. This direction complements literature concerning targeted care interventions and inequalities in service accessibility (47,49).

Second, Cluster 4 suggests investigating neighborhood deprivation and healthcare accessibility in relation to preterm birth and low birth weight. Linking birth registries with socioeconomic indicators and maternity-service locations could distinguish individual disadvantage from geographic conditions (44,48). Third, Clusters 2 and 5 suggest examining maternal complications and neonatal vulnerability across socioeconomic groups, particularly through antenatal detection and referral pathways. Studies could assess whether access to diagnosis and specialist care differs among pregnancies complicated by hypertensive disorders or congenital conditions.

These directions could inform evaluations of whether maternal and newborn services reach socioeconomically and geographically disadvantaged populations. Referral delay, continuity of care, health literacy, and care experience could complement mortality and birth-outcome indicators when assessing equitable service provision. The predominance of single-country publications among several leading corresponding-author countries also suggests opportunities for comparative research across differently resourced settings. Collaboration involving local researchers throughout agenda setting, study leadership, interpretation, and dissemination could preserve contextual relevance while strengthening international evidence exchange.

Scope and Limitations of the Interpretation

The findings reflect Scopus-indexed literature retrieved through 28 January 2026 using specified perinatal-mortality, social-determinant, and inequality-related search terms. Relevant studies using alternative terminology or appearing exclusively in other databases may be absent, potentially underrepresenting regional and locally disseminated evidence. Contributor rankings and citation counts are influenced by metadata attribution, database coverage, publication age, and citation practices. Keyword clusters also depend on terminology standardization and network-construction choices, which may affect cluster boundaries and the visibility of less frequent subjects.

The analysis examined publication patterns and thematic connections rather than systematically synthesizing the empirical findings of individual studies. Keyword co-occurrence indicates shared research contexts, while causal relationships and intervention effectiveness require investigation through appropriate empirical designs. Average publication years describe temporal positioning and provide limited information about topic origins, publication growth, or changing scientific importance. The proposed research directions therefore require consideration alongside critically appraised evidence and locally identified maternal and newborn health priorities.

CONCLUSION

This study aimed to map publication development, prominent contributors, citation visibility, and keyword-based thematic and temporal patterns in Scopus-indexed research on perinatal mortality and SDoH. Annual publication output developed unevenly, reaching its highest observed levels during 2023–2025. The United States and the United Kingdom led corresponding-author output, while single-country publications predominated among several leading countries. The London School of Hygiene and Tropical Medicine recorded the highest affiliation output, and BMC Pregnancy and Childbirth led journal publication counts. Steegers and Bonsel were the most productive authors, while Duley's article recorded the highest total and annualized citation counts. These findings indicate prominent contributions across clinical, epidemiological, public health, and social research within the selected corpus.

Five keyword clusters connected population health and disparities; pregnancy and obstetric outcomes; demographic, socioeconomic, and service characteristics; geographic surveillance; and neonatal conditions within socioeconomic contexts. Their composition illustrates interconnected clinical and social research themes, interpreted through the SDoH framework after the clusters were identified. Equity-related keywords displayed comparatively later average publication years, while established clinical, demographic, and socioeconomic terminology remained represented within the network. This temporal distribution reflects differences in keyword positioning without establishing topic origins, increasing publication frequencies, or replacement of earlier research perspectives.

Future research could prioritize disadvantaged populations' maternity-care access, neighborhood deprivation in relation to adverse birth outcomes, and socioeconomic differences in neonatal detection and referral. International partnerships involving local researchers could strengthen contextual comparisons and support evaluations of equitable maternal and newborn service provision. Interpretation remains bounded by Scopus coverage, search terminology, metadata consistency, publication age, and the analytical choices shaping keyword networks. The descriptive findings establish neither causal relationships nor intervention effectiveness, supporting further empirical investigation alongside broader literature coverage and critical evidence synthesis.

DECLARATIONS

Author contributions: M.M. contributed to conceptualization, methodology, software, formal analysis, investigation, writing the original draft, and reviewing and editing the manuscript. A.I.M. contributed to formal analysis, validation, supervision, and data curation. A.U.S. contributed to investigation, validation, supervision, and data curation. All authors reviewed and approved the final manuscript and accept accountability for their respective contributions and for the accuracy and integrity of the work.

All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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