




# Collaboration in early childhood services: Trends and patterns from a bibliometric study

**Authors:**

Ebni Sholikhah<sup>1,2</sup>   
Siti L. Mubasiroh<sup>3</sup>   
Maryani Maryani<sup>1</sup> 

**Affiliations:**

<sup>1</sup>Department of Educational Policy, Faculty of Education and Psychology, Universitas Negeri Yogyakarta, Special Region of Yogyakarta, Indonesia

<sup>2</sup>Doctoral Program of Leadership and Policy Innovation, The Graduate School of Universitas Gadjah Mada, Special Region of Yogyakarta, Indonesia

<sup>3</sup>Department of Islamic Education, Faculty of Islamic Studies, Universitas Islam Indonesia, Special Region of Yogyakarta, Indonesia

**Corresponding author:**

Ebni Sholikhah,  
ebnisholikhah@uny.ac.id

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**Background:** Collaboration in early childhood services is essential for integrating interdisciplinary efforts to support child development. Despite its importance, research trends in this area remain fragmented and require systematic mapping.

**Aim:** This study aims to analyse research trends on collaboration in early childhood services over the past 11 years (2013–2023) using bibliometric analysis.

**Setting:** The study examined 437 relevant documents retrieved from the Scopus database, focusing on publication trends, influential contributors, emerging themes and future research directions.

**Methods:** A bibliometric analysis was conducted using PRISMA guidelines. Data were processed using Microsoft Excel, Harzing's Publish or Perish, and VOSviewer to identify research networks, key contributors and thematic patterns.

**Results:** Findings indicate fluctuating publication trends, with significant contributions from authors in developed countries. Emerging research highlights the significance of family–professional partnerships, interdisciplinary collaboration and technology integration in child welfare services. However, studies remain concentrated in high-income regions, with limited insights from diverse socio-cultural contexts.

**Conclusion:** This study provides a comprehensive overview of collaborative research in early childhood services and identifies future research needs, including expanding studies in underrepresented regions, developing tools to assess collaboration effectiveness, and integrating mental health services into early childhood programmes.

**Contribution:** The study contributes to the field by offering a systematic understanding of research trends, identifying knowledge gaps and proposing directions for future collaboration research in early childhood services.

**Keywords:** collaboration; early childhood services; child; bibliometrics analysis; early childhood development.

## Introduction

Collaboration in integrated early childhood services has become increasingly practised in various parts of the world as a means of responding to challenges unique to young children (OECD 2023). Practitioners have come to appreciate the contribution of families, educators and health professionals through collaboration in meeting the needs of young children with problem behaviours or developmental delays (Kupzyk et al. 2023; Green et al. 2014). Interprofessional collaboration has been said to foster quality of service and child outcomes, but a divergence between practice and theory persists (Mason, Brown & Carter 2023). In other words, there remains a gap between interprofessional collaboration in theory and practice. Organised interprofessional collaboration between sectors is also emphasised to ensure that there is a robust framework for providing early childhood care and education (Manwedi-Thulo et al. 2023). A clear framework and resource provision are factors that would enhance participation among stakeholders (Li et al. 2024). Despite the importance of interprofessional collaboration being pervasive, more clarity on how it works and its application in different contexts is needed. In addition, more studies are required to demonstrate new forms of interprofessional collaboration across contexts (Manwedi-Thulo et al. 2023; Mason et al. 2023).

Early childhood services encompass programmes and support systems aimed at nurturing and promoting a child's development from conception to the age of eight, encompassing

health, education and social welfare interventions (UNICEF 2017). The importance of early childhood development services has been echoed in the sustainable development goals (SDGs), particularly in Target 4.2, which aims to ensure access to quality early childhood development, care and pre-primary education by 2030. UNICEF introduced the Programme Guidance for Early Childhood Development (2017) to achieve zero hunger, good health and well-being, quality education, peace and justice. This programme illustrates the importance of intersectoral collaboration practices in achieving early childhood development. In the regional context, Southeast Asian leaders focused on early childhood development by announcing the 'ASEAN Leaders Declaration' on Early Childhood Care and Education in Southeast Asia in 2023 (ASEAN 2023). This declaration provides ASEAN countries with a framework that promotes optimal early childhood development and calls for collaboration to strengthen sustainable co-operation between civil society, international organisations, academic institutions and the private sector in early childhood development. Sri Lanka serves as an example of a country implementing collaboration through the Sri Lanka Early Childhood Development (ECD) Project to enhance access to early childhood development services (Yanez Pagans, Dey & Sosale 2024). Thus, the framework at the global and regional levels shows the importance of collaborative practices in optimising early childhood development, and its existence is worth exploring theoretically.

Research on collaboration in early childhood services has developed with diverse focus in recent years. For example, McIsaac et al. (2020) pointed out aspects of collaboration drivers such as leadership, resources, task clarity and formal agreements in early childhood service integration. In addition, Alverson, Ginn and Gilbert (2019) stressed the relevance of collaboration to improve the access and quality of district preschool and head start services. Other research has shown the importance of collaboration in identifying and reporting disadvantaged children to create child health and well-being interventions (Horm, Brophy-Herb & Peterson 2024; Toros, Tart & Falch-Eriksen 2021). In another context, Matjokana (2024) showed that collaboration in early childhood education and care from the Department of Basic Education (DBE), Department of Social Development (DSD) and Department of Health (DoH) in South Africa still faces barriers to coordination, resulting in fragmented and less effective early childhood services. However, the differences in the focus of previous research have not been systematically explained. This mapping is needed to help researchers understand the picture of collaborative research trends in early childhood services to carry out more visionary follow-up research. This study fills this gap in the literature.

This study aims to analyse the development of research on collaboration in early childhood services using a bibliometric analysis. Conducting a bibliometric analysis

of this topic is crucial for comprehensively understanding the current landscape and informing future research directions. This method is significant because it offers a thorough overview of the current knowledge framework, highlights research gaps and steers future research efforts (Donthu et al. 2021). We posed the following research questions:

- *What have been the trends in research publications about collaboration in early childhood services over the past 11 years?*
- *Who are the most active contributors, including authors, institutions and countries, in the early childhood services literature?*
- *What key themes are emerging in the literature on collaboration within early childhood services?*
- *What are the possible future directions for research on collaboration within early childhood services?*

## Research methods and design

We evaluated current trends in the academic literature on collaboration in early childhood services through bibliometric analyses. Bibliometric analyses play a crucial role in academic research by facilitating the discovery of literature trends and highlighting areas in need of further exploration (Donthu et al. 2021). Data were collected through a systematic search using the PRISMA protocol based on the Scopus database. The PRISMA protocol was adopted from <https://www.prisma-statement.org/prisma-2020-flow-diagram>. Scopus was chosen because of its trusted reputation as one of the largest sources of academic research. The search query was carefully designed to incorporate various keywords directly associated with collaboration in early childhood services. Keywords such as 'collaboration', 'collaborative', 'partnership' and 'early child' were chosen to ensure comprehensive coverage of the subject, allowing for a broad and globally relevant analysis rather than focusing on a specific geographical region. However, we acknowledge that this approach may limit the representation of region-specific perspective, such as African or South African context, which will be discussed in the study's limitations.

The search resulted in 437 relevant studies. Figure 1 illustrates the PRISMA diagram, outlining the search strategy used to retrieve documents for analysis. Further analysis was performed using tools such as Microsoft Excel, Harzing's Publish or Perish, and VOSviewer, while bibliometric analysis provides valuable quantitative perspectives or literature non-indexed in major databases. To address this, we employed a comprehensive keyword selection strategy and complemented the findings with thematic interpretations to ensure a well-rounded understanding of the topic.

## Ethical considerations

This study followed all ethical standards for research without direct contact with human or animal subjects.

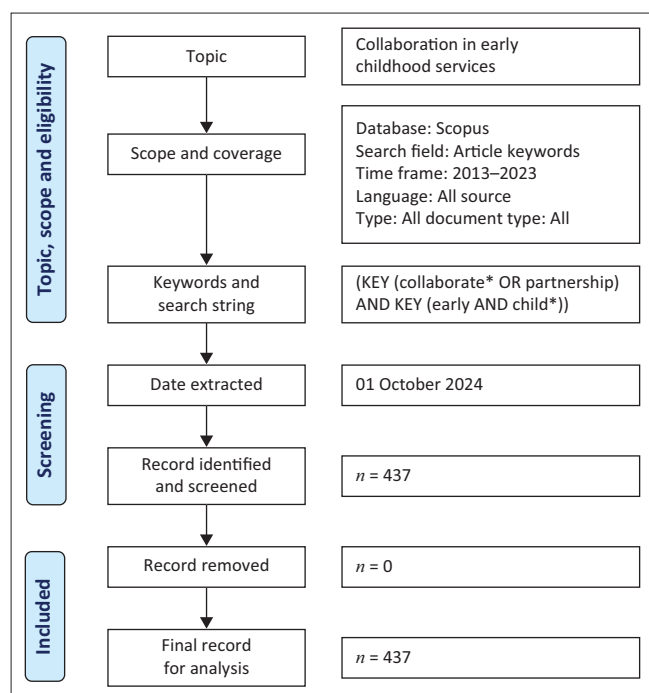


FIGURE 1: PRISMA flow diagram.

## Results and discussion

### Current state of collaboration research on early childhood services

Table 1 presents a comprehensive summary of the scholarly work related to collaboration in early childhood services over the past 11 years. We abbreviated the total number of publications as TP and the percentage as %. These articles dominated as the main publication type (79.2%), followed by reviews (8%) and book chapters (4.6%). The literature on this topic is mostly published in journals (90%), with other sources such as book series and conference proceedings contributing only slightly. English was the dominant language of publication, accounting for 95.7% of the total, indicating that the research was aimed at an international audience. In terms of research fields, Social Sciences was the most productive area with 31% of publications, followed by Medicine (26%) and Psychology (20%), indicating that the topic is closely related to disciplines that focus on human well-being and development. Social Sciences, Medicine and Psychology stand out because collaboration in early childhood services involves complex interactions between social aspects, physical health and the mental development of children (Haight, Gokiart & Daniels 2023; Sofii et al. 2023). It is important to note that in Scopus classification, Social Sciences includes education, social work, sociology and political science. Therefore, topics related to early childhood education and teacher training are already part of this category. In addition, fields such as Nursing, Computer Science, Arts and Humanities, and health professions enrich research in this domain. For example, fields such as Computer Science and Engineering can discuss collaboration in child development interventions through technology, such as digital diagnostic platforms

TABLE 1a: Descriptive statistics.

Item	TP	%
<b>Document type</b>		
Article	346	79.2
Review	35	8.0
Book chapter	20	4.6
Conference paper	20	4.6
Editorial	6	1.4
Note	4	0.9
Book	2	0.5
Letter	2	0.5
Short survey	2	0.5
<b>Source type</b>		
Journal	392	90.0
Book series	21	4.8
Conference proceeding	17	3.9
Book	7	1.6
<b>Language</b>		
English	421	95.7
German	7	1.6
French	5	1.1
Croatian	3	0.7
Afrikaans	1	0.2
Norwegian	1	0.2
Russian	1	0.2
Spanish	1	0.2

TP, Total publications.

TABLE 1b: Descriptive statistics.

Items	TP	%
<b>Subject area</b>		
Social Sciences	220	31.0
Medicine	185	26.0
Psychology	143	20.0
Nursing	33	4.6
Computer Science	28	3.9
Arts and Humanities	24	3.4
Health Professions	18	2.5
Biochemistry, Genetics and Molecular Biology	14	2.0
Neuroscience	12	1.7
Engineering	8	1.1
Business, Management and Accounting	6	0.8
Immunology and Microbiology	6	0.8
Environmental Science	4	0.6
Decision Sciences	2	0.3
Dentistry	2	0.3
Energy	2	0.3
Veterinary	2	0.3
Agricultural and Biological Sciences	1	0.1
Mathematics	1	0.1
Multidisciplinary	1	0.1
Pharmacology, Toxicology and Pharmaceutics	1	0.1

TP, Total publications.

and tools for child health (Adiguzel, Sarikabadayi & Elbasan 2023; Nazare et al. 2022). This suggests that research on collaboration in early childhood services not only covers social science and health disciplines but also is increasingly utilising technological innovations to support holistic child development.

Figure 2 shows trends in publications and citations from 2013 to 2023. It shows significant fluctuations in both the number

of documents published and citations obtained. The year 2013 showed a very high number of citations despite the relatively small number of documents published, which may reflect the large impact of some seminal publications. However, citations experienced a sharp decline in 2014, even though the number of documents started to increase. Since 2015, publications have increased significantly, peak in 2018, indicating the year as a high point in academic interest. This reflects a high interest in collaboration in early childhood services, potentially influenced by global agendas such as the SDGs, global declarations on early childhood development and attention to the importance of interdisciplinary services in the health, education and social sectors. Early childhood development (ECD) encompasses the holistic growth of young children, including their cognitive, emotional, social and physical well-being. Early childhood services play a fundamental role in supporting ECD by providing structured educational, health and social interventions that ensure optimal development (UNICEF 2017). Cross-sector collaborative programmes supported by organisations such as UNICEF, UNESCO and WHO and the Global Education Coalition members (2024) may be a driving force for research in these years. The year 2018 recorded a high number of citations along with an increase in the number of documents, indicating that the research published this year had significant global relevance and impact.

Although the number of published documents remained relatively stable from 2018 to 2022, citations started to decline, most likely because of the 'publication delay effect', that is, new documents have not received significant attention. This period also coincided with the global impact of the COVID-19 pandemic, which may have shifted the focus to the challenges of implementing collaborative early childhood services in times of crisis (Lozančić & Mirošević 2021). Although the number of citations is decreasing, a stable publication rate indicates continued interest in the field, reflecting efforts to address the growing need for integrated health, education and social protection systems. The decrease in citations may be attributed to the diversification of more specialised research topics and contexts, which have dispersed citations in the post-crisis period.

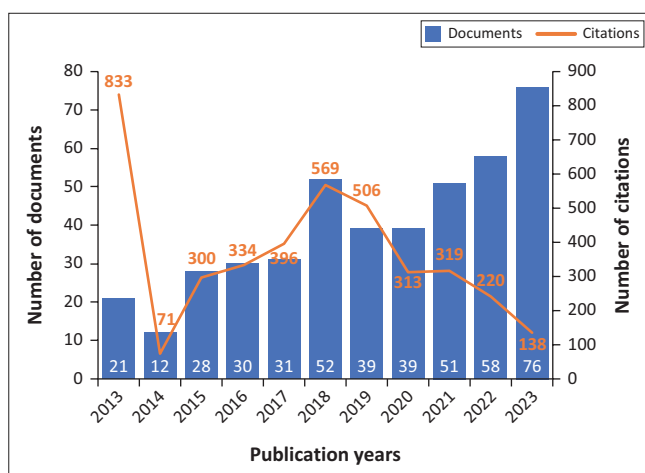


FIGURE 2: Publication and citation analysis trends.

In 2023, there was a significant spike in publications, with 76 documents marking the highest output during the observation period. However, citations of these new publications remain relatively low, possibly because it takes a long time to gain recognition in scientific circles. This increase in research may reflect renewed attention to global agendas, such as the SDGs, and new priorities such as post-pandemic recovery, integration of technology in collaborative services and reassessment of policies for early childhood development. This increase in results indicates a turning point, where these studies are poised to have a significant impact on the field as they become more popular in the coming years.

As presented in Table 2, the 437 analysed papers collectively received a total of 3999 citations, with an annual average of 363.55 citations. This highlights the enduring interest in and ongoing significance of research on collaboration within early childhood services. The h-index of 25 and the g-index of 46 further demonstrate the considerable influence of a large volume of publications, indicating the presence of a well-cited and influential body of research. Moreover, an average of 3.73 authors per publication underscored the collaborative approach commonly adopted in research within this field, demonstrating the involvement of multiple contributors in each study. This insight was obtained using Harzing's Publish or Perish software, which provides valuable citation metrics to assess the research impact within this domain.

Table 3 highlights the articles that have significantly impacted health, education and early childhood development. Publications with high citation rates tend to address topics relevant to global needs, such as STEM-based education, trauma-based interventions, cross-sector collaboration and family support. The most highly cited article is by Goss et al. (2013) with 364 citations, which discusses cancer control planning in Latin America and the Caribbean. M.U. This article is an example of how a very specific but critical topic can attract widespread attention, demonstrating its relevance to global or regional needs. The second highly cited article was 'Coding as a playground: Promoting positive learning experiences in childhood classrooms', written by Bers et al. (2019). It has 183 citations, reflecting popular topics in early childhood education. This study explores positive learning experiences through coding in early childhood classrooms, a topic that has become increasingly relevant in the digital age.

TABLE 2: Citation metrics.

Metrics	Data
Citation Years	11 (2013–2023)
Papers	437
Total citations	3999
Citations/Year	363.55
Citations/Paper	-
Authors/Paper	3.73
h_index	25
g_index	46



Articles with the third and fourth highest citations indicated topics of collaboration in health-related children's services. A study by Hyman, Susan and Scott (2020), with 150 citations, focused on the recognition and medication of children with autism spectrum disorder, demonstrating the importance of collaboration between research and medical practice to support children with autism. A study by Adams et al. (2013), with 126 citations, highlighted the significant partnership between medical services and early childhood education services (IDEA Part C) to achieve the best outcome for children needing early intervention. Subsequent studies have demonstrated the importance of collaborative approaches, technology integration and cross-sector support to improve early childhood education quality, family well-being and outcomes of home-based interventions, thereby strengthening the positive impact of family- and community-centred services.

Most citations of the articles on the list were published in health journals such as *The Lancet Oncology* and *Pediatrics*, indicating the dominance of the health perspective in discussions on early childhood service collaboration. This focus reflects the importance of medical services in supporting child development. However, contributions from other fields, such as Computers and Education and School Mental Health, highlight that collaborative approaches are not limited to the health sector alone. This shows the need for a comprehensive cross-sector approach

to holistically support early childhood. Overall, these articles offer valuable insights and practical solutions that are well recognised in the literature on collaboration in early childhood services, making them essential references for researchers and practitioners in the field.

### The most active author, institution and country

Table 4 displays the number of authors, institutions and countries contributing to publications related to collaboration in early childhood services by listing the top authors based on their number of publications. Ališauskienė, S. leads with 5 publications, followed by Kairienė, D., Hanssen, N.B., and Kangas, J. who have 4 publications each. These authors are active in collaborative research on early childhood services and have contributed significantly to the field. The main topics consistent in their writings are interprofessional collaboration as well as collaboration between families and professionals in the context of early childhood services (Ališauskienė et al. 2023; Kairienė & Ališauskienė 2023).

Table 4 also shows the top institutions affiliated with authors focusing on collaborative research in early childhood services. Nord Universitet is the most active institution with nine publications, followed by the University of California and the University of Jyväskylä, which have seven publications each. Institutions such as Johns Hopkins

**TABLE 3:** Highly cited articles.

Authors	Title	Year	Source	Cites
P.E. Goss, et al.	Planning cancer control in Latin America and the Caribbean	2013	<i>The Lancet Oncology</i>	364
M.U. Bers, et al.	Coding as a playground: Promoting positive learning experiences in childhood classrooms	2019	<i>Computers and Education</i>	183
S.L. Hyman, et al.	Identification, evaluation, and management of children with autism spectrum disorder	2020	<i>Pediatrics</i>	150
R.C. Adams, et al.	Early intervention, IDEA part C services, and the medical home: Collaboration for best practice and best outcomes	2013	<i>Pediatrics</i>	126
S. Parsons, et al.	Commentary - Bridging the research and practice gap in autism: The importance of creating research partnerships with schools	2013	<i>Autism</i>	79
T. Adirim, L. Supplee	Overview of the federal home visiting program	2013	<i>Pediatrics</i>	77
A. Pugnali, A. Sullivan, M.U. Bers	The impact of user interface on young children's computational thinking	2017	<i>Journal of Information Technology Education: Innovations in Practice</i>	64
A. Balcells-Balcells, et al.	Impact of supports and partnership on family quality of life	2019	<i>Research in Developmental Disabilities</i>	54
S. Sierau, et al.	Effects of home visitation on maternal competencies, family environment, and child development: A randomized controlled trial	2016	<i>Prevention Science</i>	53
S. Shamblin, D. Graham, J.A. Bianco	Creating trauma-informed schools for rural appalachia: The partnerships program for enhancing resiliency, confidence and workforce development in early childhood education	2016	<i>School Mental Health</i>	49

Note: Please refer to the full reference list of this article, available at <https://doi.org/10.4102/sajce.v15i0.1684>, for more information.

**TABLE 4:** The most active author, institution and country.

Author	TP	%	Institution	TP	%	Country	TP	%
Ališauskienė, S.	5	1.9	Nord Universitet	9	2.0	United States	174	29.9
Kairienė, D.	5	1.9	University of California	7	1.5	Australia	53	9.1
Hanssen, N.B.	4	1.5	University of Jyväskylä	7	1.5	United Kingdom	47	8.1
Kangas, J.	4	1.5	Johns Hopkins University	6	1.3	Norway	28	4.8
Rouse, E.	4	1.5	University of Washington	6	1.3	Canada	27	4.6
Agulnik, A.	3	1.1	Macquarie University	6	1.3	Finland	14	2.4
Clayton, O.	3	1.1	University of Minnesota	6	1.3	Germany	12	2.1
Hadley, F.	3	1.1	Emory University	5	1.1	South Africa	12	2.1
Harju-Luukkainen, H.	3	1.1	Baylor College of Medicine	5	1.1	Sweden	11	1.9
Kalmpourtzis, G.	3	1.1	The University of Auckland	5	1.1	India	10	1.7

Note: Please refer to the full reference list of this article, available at <https://doi.org/10.4102/sajce.v15i0.1684>, for more information.

TP, Total publications.

University and the University of Washington contributed significantly to six publications each. These institutions showed active engagement in research on early childhood services, highlighting their important role in the development of research related to cross-sector collaboration in this area. The United States has the highest contribution of 174 publications, demonstrating the dominance of research from this country in the field of early childhood service collaboration. Australia came second with 53 publications, followed by the United Kingdom with 47 publications. Other countries such as Norway and Canada also contributed significantly to this research. This shows that research on collaboration in early childhood services is largely concentrated in developed countries, reflecting a gap in the research in developing countries.

This study also analysed the titles of the sources with the greatest number of publications and their contribution to the literature on collaboration in early childhood services.

Table 5 shows that the journals most active in publishing literature on this topic covered a wide range of disciplines, with a significant focus on education and health. The *Early Childhood Education Journal* was the leading source with 12 publications (3.8%), followed by the *European Early Childhood Education Research Journal* with 11 publications (3.5%). Both journals highlight the importance of interprofessional collaboration in early childhood education, with studies discussing how co-operation between educators, families and health professionals can strengthen child development outcomes. In addition, journals such as *Critical Cultural Studies of Childhood* and *Early Child Development and Care* (10 publications each, 3.2%) focused on the social and cultural dimensions of early childhood services, highlighting the importance of a holistic perspective in supporting child development.

Other journals such as *Pediatrics* (8 publications, 2.5%) and *Children and Youth Services Review* (7 publications, 2.2%) emphasise aspects of collaboration in health and social services for children, especially those who require special assistance or are at a disadvantage. These journals reflect a multidisciplinary approach to collaboration in early childhood services, involving cross-sectoral interactions between the education, health, social and cultural sectors. Overall, the distribution of publications across these journals underlines the importance of cross-sector collaboration in

creating more effective and holistic early childhood services (Garvis et al. 2016).

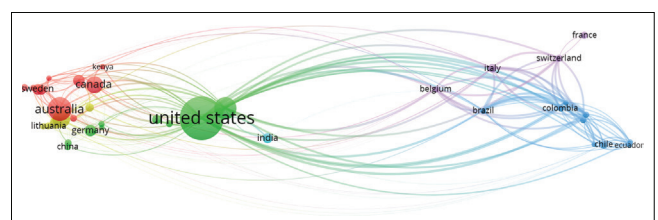
The network visualisation presented in Figure 3 shows that global research collaboration is heavily dominated by developed countries. The United States appears to be the largest centre of global collaboration in this network, as indicated by the larger size of the nodes and large number of connecting lines to various countries. This reflects the dominant role of the United States in research involving cross-national collaboration. Regional collaboration patterns were also identified. Australia and Canada are also important nodes in this network, with many connections to countries in their respective regions, such as Germany, Sweden and Lithuania. This shows strong collaboration between developed countries in various parts of the world. India also has strong connections with the United States, indicating a significant collaboration between developed and developing countries in the context of global research.

Global collaboration significantly influences the quality and coverage of scientific publications, especially from data on publication sources, authors, institutions and countries. The United States, as the country with the highest publication contribution (29.9%), is the main centre of the global collaboration network. This can be seen from the involvement of large institutions such as the University of California and Johns Hopkins University, which contribute significantly to multidisciplinary journals such as the *Pediatrics* and *Children and Youth Services Review*. The dominance of the United States means that international collaboration is often focused on countries with strong research resources, allowing them to become key drivers of the global research agenda.

However, cross-country collaboration also enriches research by including diverse perspectives from other countries, such as Australia (9.1%) and the United Kingdom (8.1%) (Table 4). Key journals such as the *Contemporary Issues in Early Childhood* and the *European Early Childhood Education Research Journal* provide a platform for research on global topics such as early childhood education, intervention and social service integration. Additionally, contributions from countries such as Norway, Canada and Finland – although smaller – show that cross-continental collaboration helps bridge knowledge gaps and provides relevant solutions to local and global needs. While our analysis includes contributions from various countries worldwide, representation from African nations, including South Africa, Ethiopia, Kenya, Zambia, Tanzania, Uganda, Ghana and Nigeria, remains relatively limited

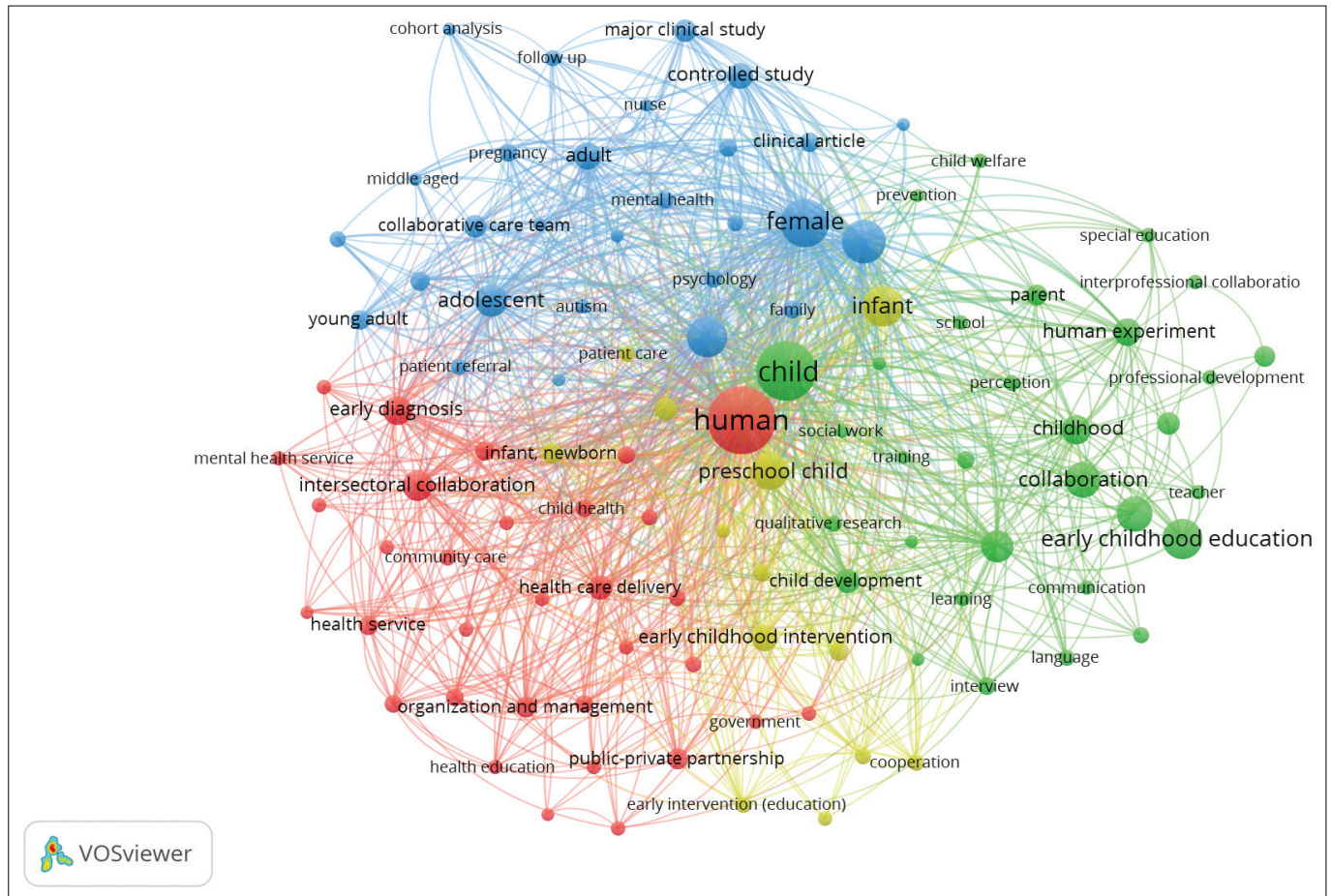
**TABLE 5:** Sources titles with the highest number of publications.

Source title	Total publication	%
<i>Early Childhood Education Journal</i>	12	3.8
<i>European Early Childhood Education Research Journal</i>	11	3.5
<i>Critical Cultural Studies of Childhood</i>	10	3.2
<i>Early Child Development and Care</i>	10	3.2
<i>Pediatrics</i>	8	2.5
<i>Children and Youth Services Review</i>	7	2.2
<i>International Journal of Early Years Education</i>	6	1.9
<i>Children S Geographies</i>	5	1.6
<i>Contemporary Issues in Early Childhood</i>	5	1.6
<i>Early Intervention in Psychiatry</i>	5	1.6



Note: This figure was created by the authors using VOSviewer.

**FIGURE 3:** Network visualisation of collaboration country.



Note: This figure was created by the authors using VOSviewer.

**FIGURE 4:** A network visualisation map of author keywords.

compared to Europe and North America. This suggests a need for further research on early childhood collaboration in African contexts, as it may offer unique insights into region-specific challenges and opportunities. Thus, global collaboration not only increases the volume of publications but also broadens the impact of research by ensuring multidisciplinary and multi-contextual representation.

## The emerging themes

The bibliometric visualisation presented in Figure 4 offers a detailed summary of the key themes emerging in research on collaboration in early childhood services. The most frequently occurring keyword, 'human', underscores the centrality of human development as a driving force behind the collaborative efforts discussed in the literature. The visualisation revealed several distinct thematic clusters, reflecting the multidimensional nature of this research field.

One prominent theme is early childhood education and collaboration, which forms the focal point of the network. This cluster emphasises the engagement of families, teachers and professionals in supporting early child development and education. Within this theme, interprofessional collaboration plays a crucial role, especially in addressing the educational and developmental needs of children with special

demands. For instance, Sofii et al. (2023) explored inclusive education and interprofessional collaboration, demonstrating the importance of teamwork in addressing diverse educational needs. Other researchers have highlighted the critical role of parental engagement in child development (Almendingen, Clayton & Matthews 2022; Demircan 2018; Fyssa, Tsakiri & Mouroutsou 2023). The emphasis on collaboration among professionals reflects the growing recognition of teamwork as a critical element in fostering inclusive and effective learning environments. Another significant theme revolves around health services and early intervention. This cluster highlights the importance of integrating the health, social services and education sectors to provide comprehensive support for children, particularly in mental health services and early intervention programmes (Albuquerque, Aguiar & Magalhães 2020; Balcells-Balcells et al. 2019; Breitborde et al. 2018). The data indicate a strong focus on early identification and support for at-risk young children, demonstrating the value of interdisciplinary collaboration in promoting child well-being.

Beyond these primary themes, the analysis also reveals the role of intersectoral collaboration in policy and service delivery. Government involvement in supporting early intervention services emerges as a key area of focus, with studies underscoring the importance of cross-sectoral



partnerships to enhance service accessibility and effectiveness (Blanken et al. 2022; Matijaš & Bulić 2021). Additionally, clinical research and the use of innovative technologies, such as digital health tools, have begun to shape the discourse around collaborative approaches in early childhood development. For example, Adiguzel et al. (2023) examined family collaboration in digital health tools for child development, and Nazare et al. (2022) explored technology-assisted coaching for children with neurodevelopmental disabilities.

The collaborative nature of research in early childhood services shows an average of 3.73 authors per paper. This indicates the widespread practice of teamwork and collective efforts to address the complex challenges of early childhood development (Breitborde et al. 2018; Jose et al. 2021). The keyword analysis in Figure 4 reveals a strong emphasis on terms like 'human', 'child' and 'collaboration', highlighting the shared focus on interdisciplinary approaches to improving child outcomes. Emerging research themes, including interprofessional collaboration, early intervention and cross-sectoral integration of health, education and social services, reflect current research priorities and underline the critical importance of interdisciplinary efforts. These themes demonstrate that effective collaboration across sectors and disciplines is vital for addressing diverse needs and promoting holistic child development (Chiari et al. 2023; Milman et al. 2018). To build on these findings, future research should further explore innovative frameworks for collaboration, leverage technological advancements and strengthen cross-sectoral partnerships to enhance the effectiveness and reach of early childhood development services.

### Potential future research

In light of the increasing significance of collaboration in early childhood services and its critical role in enhancing child development outcomes, future research must focus on several key areas to deepen the understanding and improve the effectiveness of cross-sector collaboration. Further research is necessary to explore interprofessional collaborative practices across diverse cultural and socio-economic contexts. While studies such as those by Langner and Fukkink (2023) have provided valuable insights, there is a need for broader investigations into how collaboration can be adapted to meet the varied needs of different populations. Additionally, Hart Barnett and O'shaughnessy (2015) highlighted the importance of collaboration between occupational therapists and educators in supporting children with autism spectrum disorders, which warrants deeper exploration to optimise outcomes for these children.

The intersection of technology and collaboration in early childhood services presents a promising avenue for future research. Haight et al. (2023) emphasised the role of technology-assisted collaboration in facilitating mental health interventions within school settings. Similarly, Busillo-Aguayo, Murawski and Weiner (2015) advocated further exploration of mobile technologies in reaching

underserved children, particularly in health services. Future research should examine how digital tools can strengthen collaboration between educators, health care professionals and families, thus enabling timely and effective interventions.

Developing robust metrics to assess the outcomes of collaborative models is another vital area for future investigation. Lennon et al. (2022) suggested the need for a systematic evaluation of how collaborative interventions influence children's social and independent behaviours, particularly in outdoor play settings. Furthermore, Avari et al. (2023) underscored the importance of improving communication between teachers and families and recommended the development of tools to assess the effectiveness of such collaborations in fostering greater parental engagement in children's education.

The integration of mental health services into early childhood education programme remains an underexplored yet highly significant field. Jayaraman et al. (2015) highlighted the importance of collaborative coaching conversations in early childhood programme to support children's mental health. Future research should focus on how collaborative teams can effectively identify and address mental health issues in children at an early stage. Additionally, Orr et al. (2015) recommended further exploration of collaborative approaches to managing paediatric migraine, reflecting the broader need for research on mental health interventions within child services.

### Conclusion

In conclusion, this bibliometric analysis of collaboration in early childhood services highlights the growing recognition of interdisciplinary approaches that integrate educational, health and social services to support child development. This study confirms that early childhood education, family involvement and health interventions are key areas in which collaboration is essential for improving outcomes. Emerging research themes emphasise the essentiality of interprofessional collaboration and the role of technology in enhancing these partnerships. Despite significant progress, challenges such as organisational barriers, resource constraints and the complexity of intersectoral collaboration remain. Future research must address these gaps, with a focus on developing robust frameworks and tools to assess the effectiveness of collaborative models, particularly in diverse socio-cultural contexts. Additionally, the integration of mental health services into early childhood education presents a crucial area for further exploration, ensuring that collaborative efforts continue to evolve and meet the complex needs of early children and their families.

However, this study had several limitations. The search was limited to the Scopus database because of its reliability. Consequently, publications indexed in other databases were not included, potentially overlooking relevant research that may offer valuable insights into collaboration in early childhood services. Another limitation was that we did not assess the impact factor of the publications included in the



analysis. This decision was made because the focus of this research was to offer an overview of the research landscape and not to evaluate the quality of individual publications. Additionally, our keyword selection prioritised broader and more universally recognised terms to ensure comprehensive coverage across different regions, including Africa and South Africa. While this approach enabled the inclusion of studies from diverse geographical context, it may have overlooked region-specific studies that used localised terminology. Future research could refine keyword selection by incorporating region-specific terms and leveraging tools such as OpenRefine to ensure the accuracy and granularity of keyword analysis.

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The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Authors' contributions

E.S., S.L.M., and M.M. all contributed equally to the article. This manuscript was prepared and completed by the authors. All aspects of the research, including conceptualisation, data collection, analysis, interpretation and manuscript writing, were conducted by the authors.

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## Data availability

The data supporting the findings of this study were obtained from the Scopus database. Access to the database requires a subscription or institutional access. For more details, please visit <https://www.scopus.com>.

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