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Use of artificial intelligence in child health: A bibliometric analysis

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**Abstract**

The aim of this study is to examine the existing scientific literature on the use of artificial intelligence (AI) in the field of child health through a bibliometric analysis. In this context, the study aims to identify publication trends in the field and reveal existing research gaps. On September 4, 2025, a search was conducted in the Web of Science (WoS) database using terms such as “artificial intelligence,” “children,” “health,” and “care,” resulting in 495 articles being included in the analysis. The bibliometric evaluation was performed using the Biblioshiny interface. Publication years, keywords, and countries were analyzed. A total of 4,509 authors contributed to the 495 articles published between 1999 and 2025. The country with the highest number of publications was identified as the United States. According to the Keywords Plus analysis, the most frequently used terms were “artificial intelligence” (n=241, 19%), “children” (n=153, 12%), “machine learning” (n=99, 8%), “care” (n=30, 4%), and “diagnosis” (n=37, 3%). This indicates that scientific output on the use of AI in the field of child health has increased in recent years. Publication trends highlight that the topic has attracted significant international attention, yet some research gaps exist in the literature, underscoring the need for more comprehensive studies.

Keywords: Artificial intelligence, bibliometric analysis, child, child health**Introduction**

With the widespread digitalization of healthcare services, the use of artificial intelligence (AI) has been increasing in areas such as document management, telehealth applications, cost and quality management. In digital health services, AI-based technologies are frequently applied to enhance care quality and improve efficiency in early disease detection, diagnosis and treatment, research and educational activities, drug development and calculations, epidemic forecasting, and radiology. Moreover, through AI, patient records can be analyzed to identify at-risk individuals, and care plans can be coordinated more effectively [1,2].

From past to present, the health sciences have continuously evolved in accordance with their dynamic nature, shaped by advancements in scientific knowledge and technology. The

use of AI in health sciences encompasses a wide range of technologies that transform the roles of healthcare professionals and enhance the overall quality of patient care. Among the AI-driven tools in this field are data analysis systems, early warning mechanisms, clinical decision support systems, mobile health and sensor-based technologies, voice assistants, and robots [3]. For experienced healthcare professionals, the integration of AI-based applications has become an inevitable necessity to deliver systematic patient care through diverse competencies and to manage decision-making processes more effectively [4].

The central aim of pediatric global health is to ensure sustainable, comprehensive, and equitable improvements in child health and development. Considering the growing influence of AI and machine learning (ML) in healthcare, it is essential to examine how these technologies can contribute to achieving global health goals for children and adolescents

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[5]. The potential of technological advancements can be fully realized only if AI and ML developments in healthcare, along with their applications, are equitably shared to meet the needs of children across the globe. Ensuring this fairness is vital not only for promoting widespread improvements in child health but also for avoiding the deepening of existing inequalities [6]. Integrating emerging AI technologies into health care practice is anticipated to enhance the assessment, planning, implementation, and evaluation of the needs of both healthy and sick children [7,8].

Although there is growing interest in AI applications in pediatric health, existing bibliometric analyses remain limited, often focusing on narrow topics or specific subfields. To date, no comprehensive study has systematically mapped the global landscape of AI research in child health, identified publication trends, and highlighted key gaps in the literature. Therefore, this study is original and timely, aiming to fill this gap by providing a structured bibliometric overview of published research, revealing emerging themes, and guiding future investigations in this rapidly evolving field.

The past few years have witnessed a significant increase in studies on AI in the field of child health. This study aims to systematically analyze the existing literature through bibliometric methods and to identify the distribution of the literature, emerging trends, and existing research gaps.

Research questions

- RQ1: How are the publications distributed over the years?
- RQ2: How are the publications distributed by country?
- RQ3: What are the most frequently used keywords and themes?

Material and Methods

Study Design

The most commonly used sources in bibliometric analyses include WoS, Scopus, and Google Scholar. The WoS database is widely recognized as a comprehensive and reliable source covering all scientific disciplines and is considered a primary resource for bibliometric studies [9,10]. On September 4, 2025, a search was conducted in the WoS database using the keywords “artificial intelligence,” “children,” “health,” and “care.” The inclusion criterion was that all four keywords had to be present in each article. This approach ensured a clearly defined scope and facilitated the identification of relevant studies in the literature.

Data Analysis

Only publications written in English and classified as “Article” were included in the study. Applying these criteria resulted in a total of 495 publications eligible for the research. The compiled dataset was analyzed using the Biblioshiny software, which enables a multidimensional examination of the literature.

Ethical Approval

As this study is based solely on publicly available data, approval from an ethics committee was not required.

Results

Between 1999 and 2025, a total of 495 articles addressing the use of AI in child health were published, collectively citing 22,960 references. The field has demonstrated a notable annual growth rate of 21.03%. On average, the articles are 1.96 years old and have received 15.08 citations each. Contributions came from 4,509 authors, though only 16 studies were single-authored. Each article involved an average of 10.2 authors, with an international collaboration rate of 36.77%. Altogether, 1,034 Keywords Plus (ID) and 1,644 author-supplied keywords were identified (Table 1).

Table 1. Main information about bibliometric dataset characteristics

Description	Results
Main information about data	
Timespan	1999:2025
Sources (journals, books, etc)	308
Documents	495
Annual growth rate (%)	21.03
Document average age	1.96
Average citations per doc	15.08
References	22960
Document contents	
Keywords plus (ID)	1034
Author's keywords (DE)	1644
Authors	
Authors	4509
Authors of single-authored docs	16
Authors collaboration	
Single-authored docs	16
Co-authors per doc	10,2
International co-authorships (%)	36.77
Document types	
Article	469
Article; book chapter	1
Article; early access	20
Article; proceedings paper	1
Article; retracted publication	4

Analysis of the yearly distribution of publications revealed a limited output between 1999 and 2017. In 2019, the number of articles rose to 9. From that point onward, a steady upward trend was observed, peaking in 2025 with 143 publications (Table 2 and Figure 1).

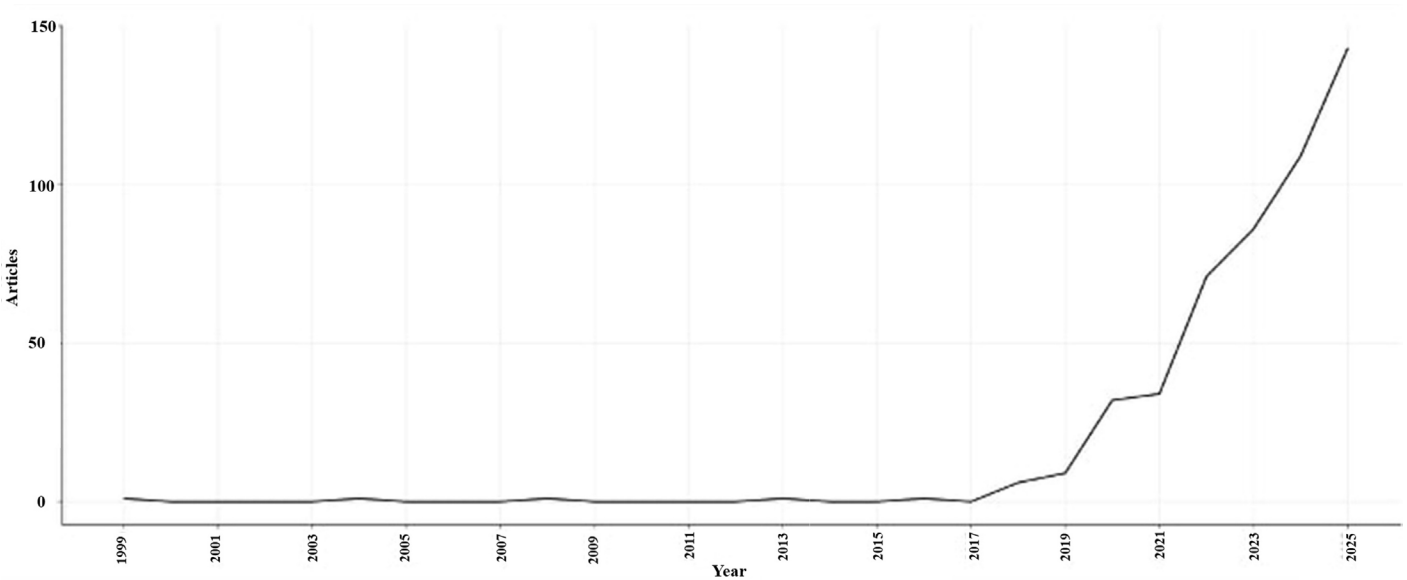


Figure 1. Annual scientific production trend (1999–2025)

Table 2. Annual distribution of publications on AI in child health (2019–2025)

Year	Articles
2019	9
2020	32
2021	34
2022	71
2023	86
2024	109
2025	143

This study employed Keyword Plus data obtained from the WoS database. Keyword Plus refers to terms automatically derived from the references of articles rather than those provided by the authors, offering insight into central themes represented in the literature.

The analysis revealed that the most commonly used keywords were “artificial intelligence” (n=241, 19%), “children” (n=153, 12%), “machine learning” (n=99, 8%), “care” (n=30, 4%), and “diagnosis” (n=37, 3%), highlighting the central and prioritized research themes in AI applications within child health. Additional frequently occurring terms included “artificial-intelligence” (n=33, 3%), “health” (n=29, 3%), and “AI” (n=28, 3%) (Figure 2).



Figure 2. Most frequent Keyword Plus terms in AI and child health literature

When the thematic map of the keywords was examined, “artificial intelligence,” “children,” “machine learning,” and “care,” “health,” “AI” were classified as core themes. Themes such as “interventions,” “virtual reality,” “depression,” and

“reliability,” “pain,” “parents” were identified as niche themes; these represent topics with concentrated research activity in specific areas but are less central in the overall literature (Figure 3).

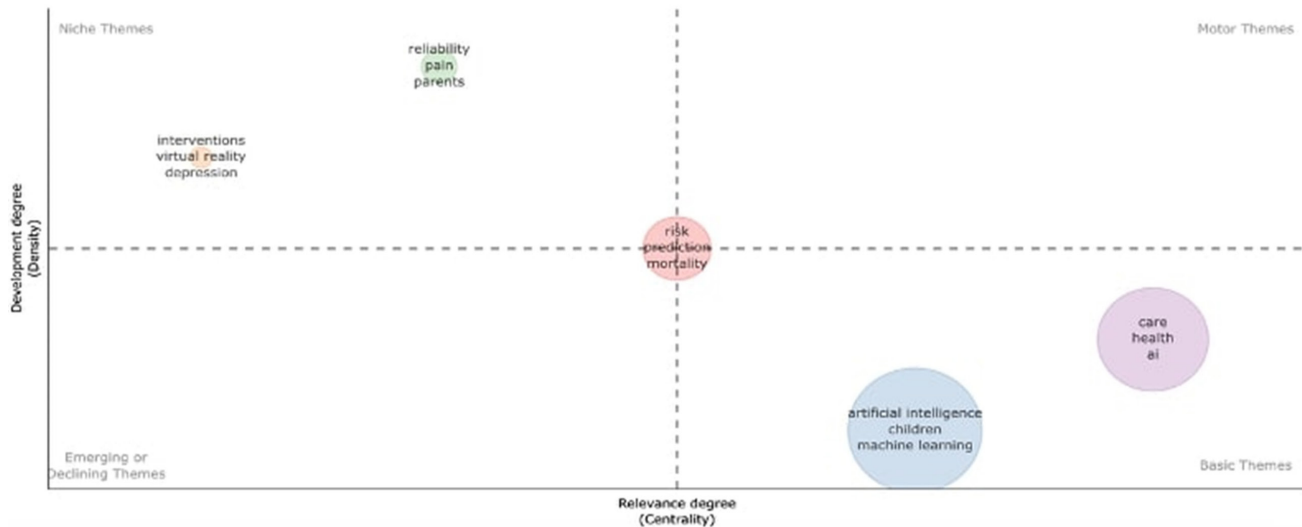


Figure 3. Thematic map of keyword clusters

The results of the network analysis illustrate the interrelationships among the keywords. Within the examined literature, “artificial intelligence” emerged as the most interconnected term, serving as the central concept and

displaying strong associations with numerous other themes. After “artificial intelligence,” the keywords “children” and “machine learning” stood out as the next most influential (Figure 4).

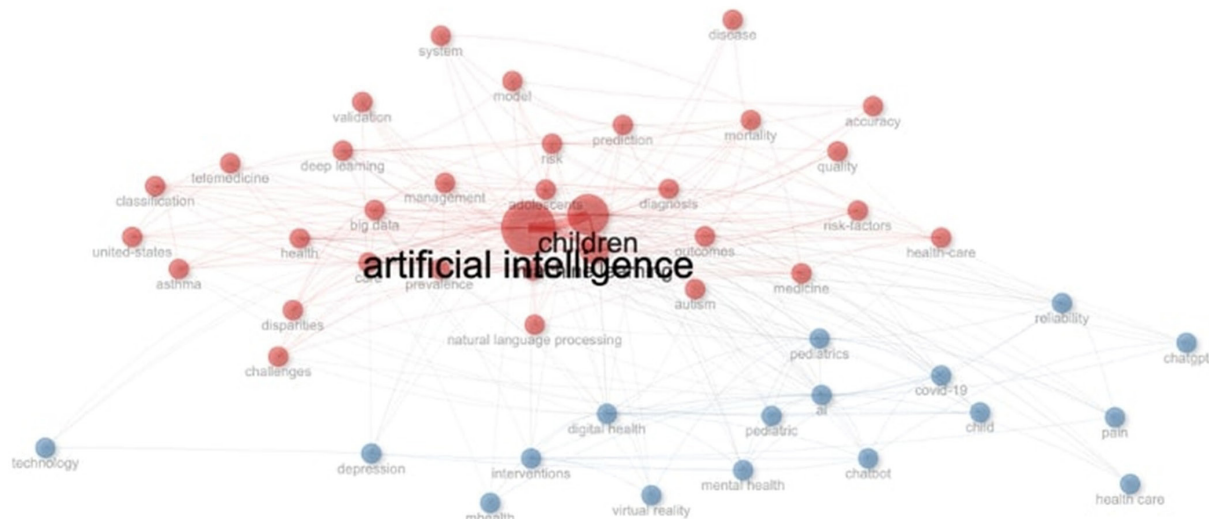


Figure 4. Keyword co-occurrence network

The country-level analysis of publication distribution showed that the United States leads with the highest number of studies. The United Kingdom, China, and Canada also stand out as key contributors (Table 3). On the map, countries

shaded in dark blue represent those with the largest output, lighter blue indicates more modest contributions, and gray areas correspond to regions with no publications in this field (Figure 5).

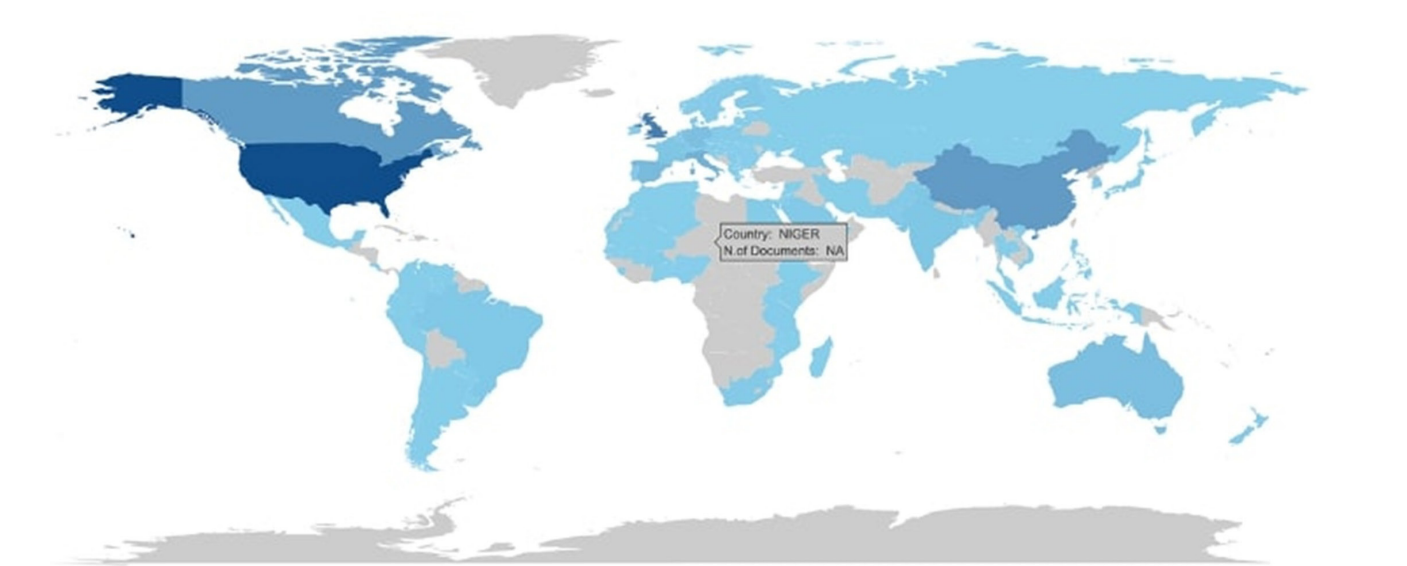


Figure 5. Global geographic distribution of publications

Table 3. Top contributing countries by publication count

Country	Frequency
USA	969
UK	588
China	366
Canada	362
Italy	196
Spain	136
Australia	106
Germany	99
Netherlands	62
India	59

Discussion

There are numerous studies on the use of AI in child health. The aim of this study is to map the literature and make the existing knowledge base visible.

The average age of the articles examined in the study is 1.96 years, and the rate of international collaboration is 36.77% (Table 1). The concept of AI is reported to have been first introduced in the 1950s [11]. Although the concept of AI has a long history, the widespread adoption of AI-supported applications in the medical field in recent years is thought to be related to concerns regarding various ethical dilemmas associated with these technologies. UNICEF emphasizes that the impacts of AI on children throughout their life cycle should be continuously assessed and monitored, and that AI systems should be tested for safety, security, and robustness [12]. Within

this framework, the findings on the average age of the articles and the rate of international collaboration in the study appear to be consistent with the reasons reported in the literature.

Analysis of the yearly distribution of articles showed that publication output remained low between 1999 and 2017. In 2019, the number of articles reached 9. From 2019 to 2025, an increasing trend was observed, with the highest number of publications recorded in 2025, totaling 143 articles (Table 2). Although AI emerged in the 1990s, its significance has markedly increased due to the growing accessibility of data. The integration of AI with health data has become one of the primary research areas of focus for researchers globally and has shown considerable growth over the years [13]. The notable increase in publications observed in 2019 is considered to indicate that the COVID-19 pandemic significantly accelerated the adoption of AI across various disciplines [14]. According to the Keyword Plus analysis results, the most frequently used keywords were “artificial intelligence” (n= 241, 19%), “children” (n=153, 12%), “machine learning” (n=99, 8%), “care” (n=30, 4%), and “diagnosis” (n=37, 3%) (Figure 2). Thematic mapping is a method used in bibliometric studies to visualize the conceptual structure of keywords. The map presented in Figure 3 illustrates the use of AI in the field of child health. Closely related or overlapping themes are grouped within a single circle, providing a holistic view of the field. The terms “care,” “health,” “AI,” “artificial intelligence,” “children,” and “machine learning” were classified as core themes. Themes such as “interventions,” “virtual reality,” “depression,” “reliability,” “pain,” and “parents” were identified as niche themes; these represent topics with concentrated research activity in specific areas but are less central in the overall literature. The network analysis results visualize the relationships and connections

among the keywords. In the analyzed literature, the keyword with the strongest connections is “artificial intelligence”. This term forms the core of the literature and shows strong links with many other themes. Following “artificial intelligence,” the other prominent keywords are “children” and “machine learning” (Figure 4). In the study, a search was conducted using the keywords “artificial intelligence,” “children,” “health,” and “care”. The Keyword Plus analysis, thematic mapping, and network analysis of the keywords show similarities with the relationships observed in the studies reported in the literature [15,16].

The country-level analysis of scientific output indicated that the United States produced the largest number of publications (Table 3 and Figure 5). Although research on the use of AI in the health field has attracted significant global attention, the studies in this area have been largely conducted by high-income countries. The United States’ high-level investments in AI research contribute to the emergence of pioneering and transformative innovations that enhance quality of life, the development of the technology industry, increased workforce motivation, and the strengthening of national security interests. In contrast, this research area remains quite limited in low-income countries, as research capacity is constrained by insufficient health resources, while rapid globalization and urbanization have led to a significant increase in public health issues [17]. After the United States, the United Kingdom stands out as the second country with publications in this field. As a developed country, the UK has established national-level AI health policies that include guidelines for the development and regulation of AI technologies in healthcare [18]. Our study findings are consistent with the literature.

As the volume of materials on a specific topic increases, researchers may find it difficult to grasp the bigger picture of a field. Summarizing the latest technologies, relationships, opportunities, and key actors in a research area creates the need for a map that connects research information, locations, themes, and the relationships among authors and institutions. Clear and concise maps derived from such large datasets become highly valuable tools for researchers [19].

Bibliometric studies are considered to provide significant contributions by enabling researchers interested in a topic to quickly access information through existing analyses, use their time efficiently, and receive guidance throughout the research process [20].

When assessed at the national level, academic and practice-oriented studies on the use of AI in child health in Türkiye remain at an early stage of development. The National Artificial Intelligence Strategy of the Republic of Türkiye (2021–2025) identifies the health sector as one of the priority areas for AI and emphasizes clinical decision support systems, early diagnosis, and improved efficiency in healthcare services as key objectives [19]. Despite this strategic framework, however, AI

applications specifically targeting child health remain limited in both clinical practice and scientific research, with existing studies predominantly concentrated in the fields of general health informatics and radiology.

Meanwhile, international organizations such as the World Health Organization and the OECD stress that the use of AI in vulnerable populations, including children, requires particular attention to ethical principles, data security, and human-centered design [20,21]. In the Turkish context, the limited number of empirical studies examining how these principles are integrated into pediatric healthcare practices points to a significant research gap. The thematic trends identified through bibliometric findings indicate that future research on AI in child health in Türkiye should extend beyond technological innovation to encompass clinical validation, ethical frameworks, and implementation processes. In this respect, the present study highlights existing gaps in the national literature at the intersection of child health and AI and offers a strategic and scholarly contribution to the field in Türkiye.

The findings further reflect increasing trends in both the quantity and quality of AI-focused academic output in the health sector. In the broader literature, bibliometric studies examining the relationship between AI and healthcare demonstrate its potential to enhance effectiveness and efficiency across multiple processes, ranging from healthcare delivery to patient care [22,23]. The growing use of AI in healthcare in recent years suggests potential benefits such as supporting diagnostic decision-making, automating clinical processes, and improving access to health services [23,24]. Nevertheless, the application of AI in pediatric settings necessitates heightened attention to sensitive ethical issues, including the privacy of children’s data, algorithmic bias, and ethical accountability. The safe and equitable use of AI-based tools is therefore critical for both the quality of pediatric care and the maintenance of public trust. Moreover, the limited research capacity for child health-focused AI studies in low- and middle-income countries has been highlighted in the literature as a risk that may exacerbate global health inequalities. Consequently, bibliometric analyses are regarded not only as tools for mapping research trends but also as valuable guides for clinical validation requirements, ethical regulatory frameworks, and implementation considerations [25].

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the analysis was conducted using the Web of Science (WoS) database. While WoS is a widely recognized and comprehensive source for bibliometric studies, relying on a single database may limit the scope of the publications included. Second, only publications written in English were included, which may have excluded important studies published in other languages, potentially limiting the global representation of the literature. Third, the inclusion

criterion was restricted to documents classified as “Article,” thereby excluding other types of publications such as reviews, letters, or conference proceedings, which may contain relevant information. Fourth, the requirement that all four keywords—“artificial intelligence,” “children,” “health,” and “care”—appear simultaneously in each article limits the scope of captured studies. Considering these limitations, it is recommended that future studies incorporate additional databases, include non-English publications, and adopt broader keyword strategies to achieve a more comprehensive understanding of the field.

Conclusion

This bibliometric analysis provides a comprehensive and structured overview of the literature on the use of artificial intelligence in child health. The findings indicate a marked increase in scientific publications in recent years, reflecting the growing integration of artificial intelligence technologies into pediatric healthcare services. The topic has attracted substantial international attention, with the United States playing a leading role; however, research output remains largely concentrated in high-income countries. This imbalance highlights the need to strengthen international collaboration and capacity-building efforts in low- and middle-income regions.

Thematic analyses reveal that existing studies primarily focus on data-driven decision-making, diagnostic support, and the optimization of care processes, as reflected by the predominance of keywords such as “artificial intelligence,” “machine learning,” “care,” and “diagnosis.” Future research should prioritize the development and evaluation of artificial intelligence-based clinical decision support systems, particularly in areas such as early diagnosis, risk prediction, and personalized care planning for children. In addition, expanding research on virtual reality, mental health, pain management, and parental involvement may enhance holistic, child- and family-centered approaches, especially within psychosocial support and rehabilitation settings.

In conclusion, future research agendas in pediatric artificial intelligence should extend beyond technological advancement to also address clinical applicability, ethical considerations, and equitable access. Strengthening interdisciplinary and international collaborations can facilitate the effective integration of artificial intelligence into pediatric clinical practice and contribute to sustainable improvements in child health outcomes.

Ethical Approval

Since the data used in this study is completely public, it does not require ethics committee approval

Conflict of Interest

The authors declare no conflict of interest.

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