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**Hospital-Based Education for Hospitalized Children:  
A bibliometric analysis**

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**Abstract**

This study maps the research landscape of Hospital-Based Education (HBE) for hospitalized children through a bibliometric analysis of 118 Scopus-indexed publications (1934–2024). Using tools such as BiblioMagika and VOSviewer, the study identifies publication trends, authorship patterns, and thematic clusters spanning health, pedagogy, and patient education. Findings show that HBE is a niche yet growing field, with rising scholarly attention after 2010 and moderate citation impact. The review highlights interdisciplinary contributions and research gaps, particularly in pedagogical frameworks. The study supports SDG 3 and 4, advocating stronger integration between education and healthcare for inclusive learning.

**Keywords:** Hospital-Based Education, School in Hospital, Inclusive education, Pediatric learning

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**1.0 Introduction**

Continuous access to education is a fundamental right for every child, including those experiencing long-term hospitalization due to chronic illnesses (Caggiano et al., 2021). This aligns with Sustainable Development Goals (SDG), specifically SDG 4 (Quality Education), which promotes inclusive and equitable learning opportunities, and SDG 3 (Good Health and Well-being), which emphasizes the holistic development of children during medical treatment.

Extended hospitalization, particularly for pediatric and adolescent patients requiring prolonged care, necessitates innovative approaches to ensure educational continuity. For these young learners—often medically stable yet confined to hospital settings—hospital-based education (HBE), also known as hospital schooling or hospital/homebound education, plays a critical role in sustaining their academic trajectory and psychosocial well-being. This is particularly relevant for children with chronic conditions such as cancer, cystic fibrosis, or congenital heart disease, whose treatments may span weeks or months. Providing uninterrupted education through

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HBE not only mitigates learning loss but also fosters normalcy, hope, and resilience, key components in promoting psychological recovery and adherence to treatment. Research suggests that structured educational engagement can improve emotional health and empower children to retain a forward-looking perspective during hospitalization (Delvecchio et al., 2019; Ogilvie, 2005; Mintz et al., 2018).

Despite its critical importance, the implementation of HBE varies widely due to systemic differences in resource availability, healthcare-education integration, and institutional policies. These inconsistencies present challenges to ensuring equitable access and optimal delivery. In Malaysia, the HBE initiative, known locally as *Sekolah Dalam Hospital*, was launched in 2011 through a strategic collaboration between the Ministry of Education (MOE), Ministry of Health (MOH), and Yayasan Nurul Yaqeen (Jong & Mohd Yasin, 2019; UNICEF, 2021). Although the program has expanded nationally, academic evaluation of its effectiveness and long-term impact remains limited (Tan & Mohamad, 2019). To bridge these gaps, this study presents a comprehensive bibliometric analysis of global HBE literature, aiming to map publication trends, authorship dynamics, disciplinary intersections, and thematic patterns from 1934 to 2024. The findings are expected to inform future policies and practices in the integration of healthcare and education for hospitalized children.

## 2.0 Literature Review

Hospital-Based Education (HBE) has been implemented under diverse designations globally, such as *Hospital Learning Units* or *Schools for Hospitalized Children*, with a shared mission of delivering curriculum-aligned instruction within clinical settings (Ciucci et al., 2024). This model not only facilitates cognitive learning but also contributes to emotional regulation, identity preservation, and psychosocial adjustment (Delvecchio et al., 2019; Mintz et al., 2018).

However, HBE faces enduring challenges, including the lack of trained educators, limited pedagogical resources, and the absence of flexible curriculum designs tailored for hospital environments (Kamarulzaman & Rahman, 2023; Smith & Brown, 2023). Effective delivery often requires seamless collaboration between healthcare providers, teachers, and families, yet such interdisciplinary integration is inconsistently practiced across systems. Previous studies have focused on qualitative insights and programmatic case studies. Nevertheless, there remains a paucity of systematic mapping of the HBE knowledge domain. Bibliometric analysis provides an empirical method for addressing this gap, allowing for an objective appraisal of research trends, scholarly impact, and thematic evolution using tools like Scopus and Web of Science (Ellegaard & Wallin, 2015; Verma & Gustafsson, 2020).

Although bibliometric techniques have been widely applied in educational domains such as online learning (Chen et al., 2021; Omar et al., 2021; Shen & Ho, 2020), educational leadership (Hallinger & Kovacevic, 2021), and learning strategies (Song et al., 2019; Kushairi & Ahmi, 2021), the HBE field remains significantly underrepresented in this methodological tradition. Existing literature tends to prioritize special education or direct interventions, leaving a gap in large-scale conceptual overviews. To address this, the present study employs a bibliometric approach to systematically explore global HBE research from 1934 to 2024. By doing so, it aims to illuminate the intellectual structure of the field, support evidence-based practice, and contribute to the advancement of inclusive educational models within hospital settings.

## 3.0 Methodology

This study adopts a bibliometric analysis approach to systematically map and evaluate the research landscape in hospital-based education (HBE), with a specific focus on School in Hospital. This method was selected for its capacity to provide a quantitative overview of scholarly output, research trends, collaboration networks, and thematic structures.

Following the guidelines of Aidi Ahmi (2024), the study used the Scopus database as the main data source due to its extensive coverage of peer-reviewed publications. A structured set of keywords, *School in Hospital*, *Hospital-Based School*, *Pediatric School*, *Hospital Classroom*, and related terms, was applied using Boolean operators (AND, OR) to ensure a comprehensive search. The dataset comprises 118 documents published between 1934 and 2024, including journal articles, conference proceedings, and book chapters. Non-research materials such as editorials and retracted articles were excluded. Metadata including author names, article titles, abstracts, keywords, and citation counts were extracted in CSV format.

Data cleaning and harmonization were conducted using OpenRefine, VOSviewer, and R, addressing issues such as duplicate entries, inconsistent author/institution names, and missing values. Tools like Biblioshiny and BiblioMagika (Ahmi, 2024) facilitated visualizations and metrics generation, such as co-authorship networks, keyword co-occurrence, and citation analysis. By employing this bibliometric approach, the study provides a comprehensive and objective mapping of HBE literature, enabling the identification of the current state and development of publications, the main types of documents used, the trends in their production, the primary subject areas and the trends annual growth of publications related to Hospital-Based Education.

Based on the bibliometric data described in Figure 1, the following research questions (RQs) are deemed appropriate for a bibliometric study on Hospital-Based Education (HBE):

- RQ1: What is the current state and development of publications related to Hospital-Based Education?
- RQ2: What are the main types of documents used in research on Hospital-Based Education, and what are the trends in their production?
- RQ3: What are the primary subject areas contributing to research on Hospital-Based Education, and what interdisciplinary implications can be observed?
- RQ4: What are the trends and patterns in the annual growth of publications related to Hospital-Based Education?

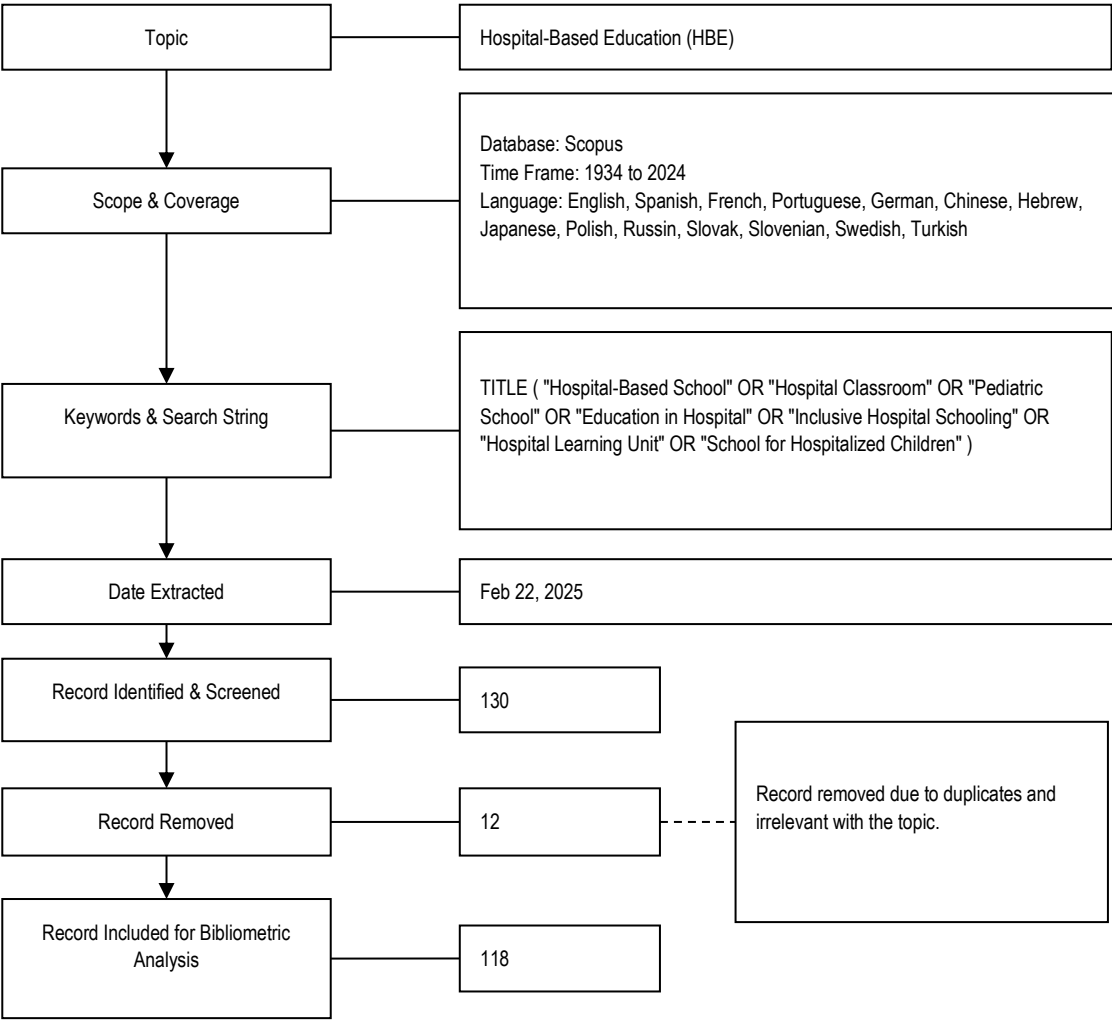


Figure 1. Flow diagram of the search strategy.  
Source: Punj et al. (2023), Moher et al. (2009)

4.0 Findings

4.1 Current State of Research on Hospital-Based Education (HBE) and Authorship and Collaboration Dynamics

Table 1. Citation Metrics	
Start Year	1934
End Year	2024
Total Publications	118
Number of Contributing Authors	289
Number of Cited Papers	46
Total Citations	298
Citation per Paper	2.53
Citation per Cited Paper	6.48
Citation per Author	1.03
Citation sum within h-Core	281
Citable Year	92
h-index	9
g-index	15
Publication Years	1934 - 2024
Citation Years	90
Citation per Year	3.31

Source: Generated by the author(s) using bibliomagika® (Ahmi, 2024)

To address the first research question, the bibliometric analysis indicates that research related to Hospital-Based Education (HBE) has been conducted since 1934 and has continued to grow until 2024, spanning 92 years of active publication. Although this timeframe is

extensive, the total of 118 publications suggests that the field remains relatively niche and requires further academic exploration compared to mainstream educational domains. The consistency of publications across nearly a century reflects a sustained interest in the issue of education for children undergoing medical treatment. However, the modest number of publications suggests that HBE has yet to become a central focus in the global education discourse, as detailed in Table 1.

A total of 289 authors contributed to the 118 publications, resulting in an average of 2.45 authors per article, which aligns with the collaborative practices typical of multidisciplinary research involving education and health. With an average of 1.03 citations per author, the field appears to still be in an early evidence-building phase and may require additional efforts to strengthen its academic reputation and scholarly impact. This creates opportunities for contemporary researchers to explore new perspectives and expand the field's influence through institutional, national, and international collaboration.

#### 4.2 Publication Trends and Growth in Hospital-Based Education (HBE) Research Publications

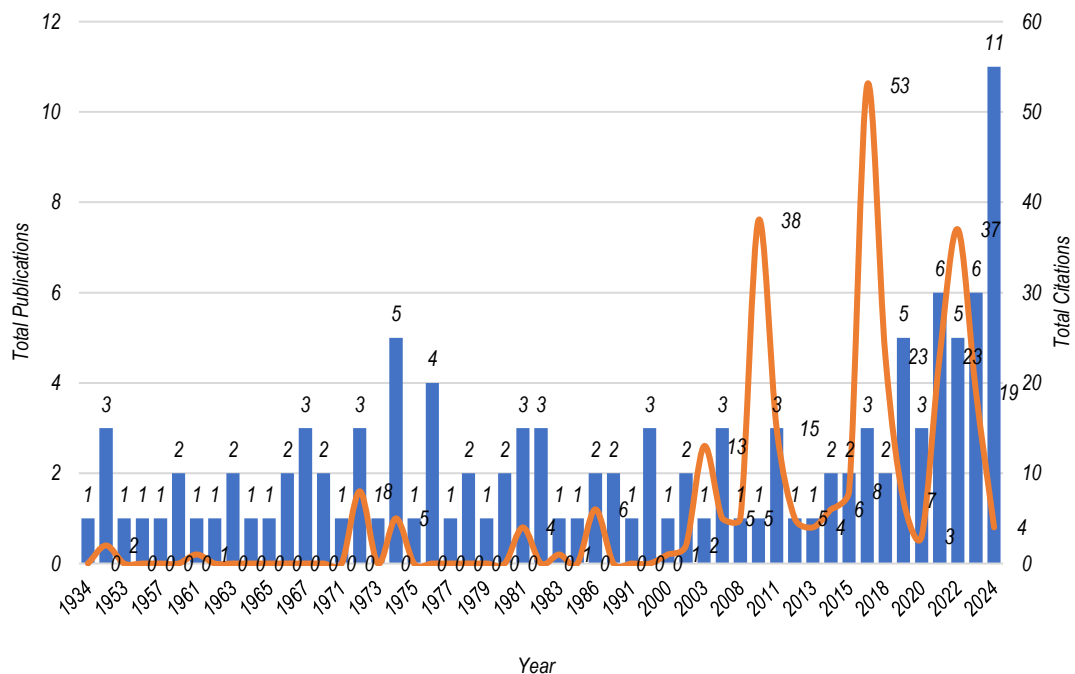


Figure 2. Total Publications and Citations by Year  
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

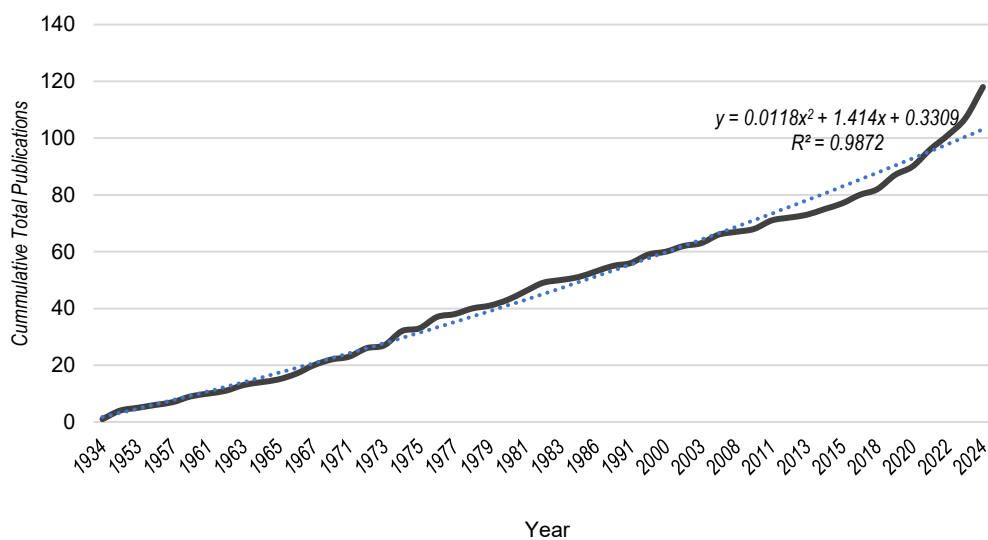


Figure 3. Publication Growth  
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Figure 2 illustrates the annual number of publications and citations in research related to Hospital-Based Education (HBE) from 1934 to 2024. Over this period, the trend reveals a progressive increase with several notable spikes in specific years. The most significant years include 2017, 2020, and 2024, each recording a high number of publications, with 2024 marking the peak at 17 publications.

Citation counts have also increased, albeit in a more uneven pattern in figure 3. The year 2017 stands out with a high citation count, suggesting the presence of several high-impact publications during that year. Elevated citation rates in certain years indicate the emergence of key reference articles that have served as foundational works for other researchers in the field. Figure 3, on the other hand, shows the cumulative growth of publications over the 90-year period. The growth curve demonstrates a steady upward trajectory with an exponential growth rate, as depicted in the regression equation:

$$y = 0.0118x^2 + 1.414x + 0.3309 \quad (R^2 = 0.9872)$$

The  $R^2$  value, which is very close to 1 (0.9872), suggests that the model fits the cumulative publication trend extremely well. The sharp increase after 2010 reflects growing awareness and concern about the importance of inclusive education for children undergoing hospital treatment. Based on both figures, it can be concluded that research in the area of Hospital-Based Education has developed consistently and significantly, despite its specialized and focused nature. The rise in both the number of publications and citations highlights the increasing interest among scholars in inclusive medical education and suggests ample opportunities for further exploration through interdisciplinary approaches and policy-oriented research.

#### 4.3 Publication by Sources Titles

**Table 2.** Most active source titles that published 20 or more documents

Source Title	TP	NCA	NCP	TC	C/P	C/CP	h	g	m
Hospitals	3	3	0	0	0.00	0.00	0	0	0.000
Eduotec	3	6	0	0	0.00	0.00	0	0	0.000
Healthcare (Switzerland)	2	11	2	15	7.50	7.50	2	2	0.400
Revista de Pedagogia	2	4	2	3	1.50	1.50	1	1	0.053
Journal of healthcare education and training : the journal of the American Society for Healthcare Education and Training / American Hospital Association	2	2	0	0	0.00	0.00	0	0	0.000
Archives Belges de Medecine Sociale Hygiene	2	2	0	0	0.00	0.00	0	0	0.000
Medecine du Travail et Medecine Legale	2	11	1	3	1.50	3.00	1	1	0.250
Clinical Pediatrics	2	2	0	0	0.00	0.00	0	0	0.000
Gestions Hospitalieres	2	2	0	0	0.00	0.00	0	0	0.000
EDM 2011 - Proceedings of the 4th International Conference on Educational Data Mining	1	2	1	2	2.00	2.00	1	1	0.067
Journal of Education and Health Promotion	1	3	1	21	21.00	21.00	1	1	0.250
European Journal of Hospital Pharmacy	1	4	1	7	7.00	7.00	1	1	0.333
Nursing mirror and midwives journal	1	1	0	0	0.00	0.00	0	0	0.000
Chinese Journal of Public Health	1	4	1	1	1.00	1.00	1	1	0.333
Proceedings of 2020 International Congress on Noise Control Engineering, INTER-NOISE 2020	1	3	1	3	3.00	3.00	1	1	0.167
Milli Egitim	1	2	0	0	0.00	0.00	0	0	0.000
Paediatrics and Child Health (Canada)	1	1	1	2	2.00	2.00	1	1	0.100
Archives hospitalières	1	1	0	0	0.00	0.00	0	0	0.000
Revista gaúcha de enfermagem / EENFURGS	1	2	0	0	0.00	0.00	0	0	0.000
Behavior Therapy	1	4	1	8	8.00	8.00	1	1	0.019

**Note:** TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Based on Table 2, the analysis of source titles reveals that publications related to Hospital-Based Education (HBE) are dispersed across a variety of journals; however, most of these journals feature only a small number of articles. For example, Hospitals and Eduotec each published three articles but recorded zero citations, resulting in an average citation per article (C/P) of 0.00, indicating a low level of visibility and academic impact.

In contrast, journals such as Healthcare (Switzerland) and the Journal of Education and Health Promotion reported high C/P values of 7.50 and 21.00, respectively, with an equal citation-per-cited-paper (C/CP) metric. This suggests that although the number of articles published in these journals is limited, their content is highly impactful and has garnered significant scholarly attention. In this context, the total number of citations (TC) and the number of cited publications (NCP) serve as critical indicators of a journal's influence.

Other sources, such as Clinical Pediatrics and Behavior Therapy, also made meaningful contributions to the citation landscape despite publishing only one or two articles. This points to the promising potential for HBE research to gain traction in both mid-tier and high-impact journals. The diversity of journal fields—spanning medicine, education, pharmacy, and psychology—further underscores

the interdisciplinary nature of HBS research. Nonetheless, the generally low h- and g-index scores across most journals suggest that the long-term influence of this body of work in the international literature remains limited and has yet to reach a consolidated stage.

These findings highlight a clear need to publish HBE-related studies in more influential and globally recognized journals. Doing so would enhance the accessibility and academic relevance of the findings, thereby contributing more substantially to the development of comprehensive policies and best practices in hospital-based education.

## 5.0 Discussion

The findings of this bibliometric analysis reveal that while research on Hospital-Based Education (HBE) has spanned over nine decades (1934–2024), the field remains relatively underexplored with only 118 publications. This suggests that despite its importance in supporting children's right to continuous education, during hospitalization, as advocated by SDG 4 (Quality Education) and SDG 3 (Good Health and Well-being) (Caggiano et al., 2021), HBE has yet to become a mainstream subject of inquiry in the global educational discourse. The relatively low citation metrics (C/P = 2.53; C/CP = 6.48) also indicate that although impactful studies exist, the overall field lacks strong visibility and academic penetration (Almazroui, 2023).

The collaborative nature of HBE research is evident, with an average of 2.45 authors per article and 289 contributing scholars. This trend reflects the interdisciplinary nature of hospital schooling, which requires cooperation between healthcare professionals, educators, policymakers, and caregivers (Kamarulzaman & Rahman, 2023). Yet, the moderate citation per author (1.03) suggests a fragmented scholarly community with limited cross-citation and theoretical development. This fragmentation may hinder knowledge consolidation and the formulation of best practices across contexts, echoing concerns in earlier literature about the lack of unified pedagogical frameworks tailored to hospitalized learners (Smith & Brown, 2023).

From a thematic perspective, the steady increase in annual publication volume, particularly after 2010, suggests growing awareness and institutional interest in inclusive education for vulnerable groups. The spike in 2024 indicates a recent surge in scholarly engagement, possibly reflecting the integration of HBE into broader discourses on education equity, digital learning, and student well-being during health crises like COVID-19 (Delvecchio et al., 2019; UNICEF, 2021). However, the variation in citation rates also underscores disparities in research quality and the absence of consistently cited foundational texts within the domain.

Furthermore, the distribution of publications across multiple, often non-specialized journals, many with low h-indexes, suggests a lack of established publishing platforms dedicated to HBE. Journals such as *Healthcare* (Switzerland) and *Journal of Education and Health Promotion* emerged as high-impact outlets, yet they featured only one or two papers each. This pattern highlights the need for more strategic dissemination of HBE findings in influential, peer-reviewed journals with wider readership and higher impact factors. The present landscape underscores a missed opportunity for researchers and institutions to consolidate HBE scholarship and advocate for its relevance through recognized academic channels (Ellegaard & Wallin, 2015).

To enhance HBE's academic stature, scholars should emphasize conceptual clarity, employ rigorous methodologies, and foster international collaboration. Integrating frameworks such as the PRISMA model in systematic reviews (Moher et al., 2009) or leveraging technologies like VOSviewer and Biblioshiny to build co-authorship and thematic maps can catalyze this effort (Verma & Gustafsson, 2020). Importantly, cross-national studies addressing context-specific challenges—such as the Malaysian School in Hospital program launched by MOE and MOH (Jong & Mohd Yasin, 2019), may illuminate adaptable models for scalable implementation. As this study demonstrates, there is both space and necessity to elevate HBE research into a robust, interdisciplinary field that bridges health and education to safeguard children's holistic development.

## 6. Conclusion & Recommendations

Hospital-Based Education (HBE), as a mechanism to ensure continuous learning for children undergoing medical treatment, represents a vital convergence between the health and education sectors (Caggiano et al., 2021; Almazroui, 2023). Anchored in the aspirations of Sustainable Development Goals—particularly SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education)—the provision of education in hospital settings affirms the right to inclusive, equitable, and uninterrupted learning for all children, regardless of health status. Through bibliometric analysis of 118 publications spanning 90 years (1934–2024), this study reveals that while HBE has garnered consistent academic attention, it remains underrepresented in mainstream educational discourse. The modest publication volume, low citation impact, and dispersed authorship reflect a field still in its formative stage, yet the post-2010 surge in scholarly output marks an encouraging shift. Journals such as *Healthcare* (Switzerland) and *Journal of Education and Health Promotion* provide promising avenues for impactful dissemination. The interdisciplinary spread of HBE research across medicine, education, and social sciences underscores the need for integrated frameworks and sustained scholarly collaboration (Delvecchio et al., 2019; Kamarulzaman & Rahman, 2023).

To strengthen the scholarly and practical impact of HBE, several recommendations are proposed. Future research should emphasize empirical investigations that evaluate HBE effectiveness across diverse cultural and institutional contexts. Educational policymakers and health administrators are urged to develop standardized guidelines encompassing curriculum design, teacher training, and interdisciplinary coordination. Additionally, investment in digital infrastructure is essential to support hybrid learning for long-term hospitalized children. National and global platforms for knowledge exchange must also be cultivated to document and disseminate best practices. Through strategic alignment among researchers, institutions, and policymakers, HBE can transition from a supplementary

intervention to a foundational component of inclusive education. These advancements will not only enhance academic legitimacy but also uphold the educational rights and holistic dignity of children navigating both illness and learning (UNICEF, 2021; Ogilvie, 2005).

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## Paper Contribution to Related Field of Study

This paper offers the bibliometric analysis of hospital-based education (HBE) research from 1934 to 2024. It maps publication trends, collaboration patterns and thematic gaps, providing empirical data to support stronger integration of health and education for hospitalized children. Unlike prior case studies, this study presents a comprehensive overview of HBE's development, highlighting its alignment with Sustainable Development Goals (SDG 3 and SDG 4). The findings contribute to inclusive education discourse and offer a reference for researchers and policymakers to design more cohesive frameworks and strategies. This work also encourages future research to address identified gaps and advance HBE as a vital field within educational and health studies.

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