Global Research Trends and Empirical Evidence on Physician Response Time and Family Psychological Outcomes in Emergency Departments: A Bibliometric Study

Dhea Anindya Cahyarini[1*], Rr. Pipiet Okti Kusumastiwi[2]

[1]Master of Hospital Administration, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Indonesia
[2]Department of Dental Public Health, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

*Email correspondence: dhea.anindya.psc25@mail.umy.ac.id

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Abstract

Physician response time is a key performance indicator in Emergency Departments (ED), influencing service efficiency and quality of care. Although research has expanded, the literature remains fragmented, limiting a comprehensive understanding of global research trends and thematic development. This study aims to analyse global research trends, scientific contributions, collaboration patterns, and thematic evolution related to physician response time in ED using a bibliometric approach. A bibliometric analysis was conducted on Scopus-indexed journal articles published between 2016 and 2025. Following the PRISMA 2020 framework, 166 eligible articles were analysed using Bibliometrix (RStudio) and VOSviewer to evaluate publication trends, citation performance, collaboration networks, and keyword co-occurrence. A total of 166 articles from 91 journals were included. The annual publication growth rate reached 16.18%, with an average of 13.2 citations per document. The United States was the leading contributor, while international collaboration accounted for 15.66% of publications. Dominant research themes focused on emergency department performance, waiting time, patient flow, patient satisfaction, and quality of care. Family-related psychological outcomes appeared as an emerging but underexplored research area. Research on physician response time has evolved from operational performance toward broader healthcare quality perspectives. The findings highlight opportunities for international research and health policies that integrate operational efficiency with patient- and family-centred emergency care.

Keywords: ***Physician Response Time, Emergency Department, Bibliometric Analysis, Patient Satisfaction, Family Psychological Outcomes***

INTRODUCTION

The Emergency Department (ED) is a critical component of modern healthcare systems, serving as the primary point of access for patients experiencing acute, life-threatening, and time-sensitive medical conditions. The ED is designed to provide rapid clinical assessment, stabilization, and initial interventions for a wide range of emergency conditions, including trauma, critical illness, and acute medical disorders requiring immediate management (Serpa, 2021;Newgard et al., 2022;Michael et al., 2021). As a 24-hour healthcare service, the ED plays a strategic role in ensuring timely diagnosis and treatment, thereby minimizing preventable complications, deterioration, and mortality among critically ill patients.

In recent years, emergency healthcare systems worldwide have faced increasing operational challenges due to rising patient demand, limited healthcare resources, and growing

clinical complexity. The increase in emergency department visits has contributed to overcrowding, adversely affecting patient flow, operational efficiency, and the quality of care delivery. Moreover, studies have shown that a substantial proportion of ED visits involve non-urgent conditions that could potentially be managed within primary healthcare settings. For example, a study conducted in Poland reported that approximately 58% of visits for minor conditions could have been managed outside the ED setting (Zasada et al., 2024). Such inappropriate utilization contributes to prolonged waiting times and places additional pressure on emergency care resources. Consequently, healthcare organizations continue to face the challenge of improving operational efficiency while maintaining patient safety and high-quality care (Afonso et al., 2024).

Emergency care depends on timely clinical decision-making, as delays in assessment and treatment can significantly affect patient outcomes. Previous studies have demonstrated that shorter emergency medical service response times are associated with improved survival outcomes, particularly in cases of cardiac arrest, stroke, and major trauma (Roberts et al., 2023). Similarly, for conditions such as sepsis, myocardial infarction, stroke, and severe injury, rapid clinical assessment and early initiation of treatment are critical determinants of successful patient management and prevention of complications (Evans et al., 2021). Consequently, healthcare systems have established various time-based performance indicators, including waiting time, door-to-doctor time, length of stay (LOS), and physician response time, to evaluate the efficiency and quality of emergency care services (Mehrolhassani et al., 2025).

Among these indicators, physician response time is an important measure of the responsiveness of medical professionals in conducting the initial assessment of patients following their arrival or triage (Herlitz et al., 2023). Timely physician involvement facilitates the early recognition of critical conditions, accelerates clinical decision-making, and supports the implementation of appropriate treatment pathways. The adoption of structured clinical approaches, including Rapid Response Systems (RRS) and Early Warning Scores (EWS), further enhances the early detection of patient deterioration and prompt intervention (Haegdorens & Van Bogaert, 2025). Conversely, delayed physician response may contribute to diagnostic delays, clinical deterioration, and reduced quality of healthcare (Tanaka & Shimaoka, 2023). Emergency department overcrowding has also been identified as a significant factor contributing to delays in medical response and diminished overall service performance (Pearce et al., 2023).

Beyond clinical outcomes, physician response time may also influence the experiences and psychological well-being of patients and their families. Waiting periods before medical

assessment are often associated with dissatisfaction, uncertainty, and negative perceptions of healthcare quality. Evidence suggests that reducing waiting times improves satisfaction among both discharged patients and those requiring further treatment (Nyce et al., 2021). Furthermore, interventions such as queue management strategies and triage optimisation have been shown to reduce both actual and perceived waiting times, thereby enhancing the overall patient experience (Bidari et al., 2021).

For families accompanying patients in emergencies, waiting time represents not only a logistical issue but also a significant psychological challenge. Family members commonly experience anxiety, fear, stress, and uncertainty, particularly when information regarding the patient's condition, prognosis, or treatment plan is limited. Previous studies have indicated that family anxiety increases when there is uncertainty about disease severity or a discrepancy between perceived and actual clinical conditions (Riegel et al., 2025). Likewise, prolonged waiting periods during emergencies and critical procedures may intensify emotional distress due to insufficient information and heightened feelings of vulnerability (Pagán-Peñalver et al., 2021;Moreno et al., 2025). Furthermore, extended waiting times may negatively affect family satisfaction by reinforcing perceptions of poor communication, service inefficiency, and inadequate support from healthcare providers (Mosleh et al., 2025).

These findings align with the growing emphasis on patient-centred care and family-centred care models in contemporary healthcare practice. These approaches promote the active involvement of patients and families through effective communication, shared decision-making, and respect for individual needs and preferences (Menear et al., 2022;Langford et al., 2021). Within emergency care settings, timely communication from healthcare professionals is essential for reducing uncertainty, strengthening trust, and providing emotional support to families. Therefore, physician response time may represent not only an operational performance indicator but also an important determinant of families' psychological experiences and perceptions of care quality.

Despite the growing recognition of the importance of emergency service efficiency and patient experience, existing research has predominantly focused on operational outcomes, including waiting times, patient flow, length of stay, and overcrowding. Studies have extensively examined interventions such as advanced triage systems, fast-track models, and telemedicine applications aimed at improving ED performance (Menear et al., 2022). However, evidence from the existing literature suggests that research examining the relationship between physician response time and family psychological outcomes remains limited and fragmented. Current studies addressing this issue are dispersed across multiple disciplines, including

emergency medicine, nursing, health psychology, and health service research, resulting in a fragmented understanding of how physician responsiveness influences family experiences in emergency care settings.

Bibliometric analysis provides an appropriate methodological approach for addressing this knowledge gap by systematically examining the evolution, structure, and trends of the scientific literature. Through the quantitative analysis of publication patterns, citation networks, collaborations, and emerging themes, bibliometric studies can provide a comprehensive overview of knowledge development within a specific research domain. Nevertheless, no previous bibliometric study has comprehensively mapped global research trends at the intersection of physician response time, family psychological outcomes, and emergency department settings.

Therefore, this study aims to analyse global research trends related to physician response time and its association with the psychological outcomes of patients' family members in emergency department settings using a bibliometric approach. The novelty of this study lies in its integration of science mapping techniques to identify publication trends, influential contributors, collaboration networks, and emerging research themes linking emergency response efficiency with family-centred healthcare experiences. The findings are expected to provide valuable insights into future research directions and support the development of emergency care policies that prioritise both operational effectiveness and patient-family-centred outcomes.

METHOD

This study employs a bibliometric analysis approach to examine the global development of scientific research on physician response time and family psychological outcomes within the context of Emergency Department (ED) care. Bibliometric methods were used to identify publication trends, author contributions, research collaborations, and the evolution of research themes through the analysis of scientific publication metadata. The literature selection process followed the PRISMA 2020 guidelines to ensure transparency and reproducibility in the identification, screening, and inclusion of relevant studies.

Bibliographic data were retrieved from the Scopus database due to its extensive coverage of international literature and its provision of comprehensive metadata suitable for bibliometric analysis. The literature search was conducted in 2025. The literature search was conducted on the title, abstract, and keywords fields, employing terms related to physician response time and Emergency Department care. Family psychological outcomes were subsequently identified

as an emerging thematic dimension through bibliometric mapping and keyword co-occurrence analysis. The search was limited to English-language journal articles published between 2016 and 2025 in the fields of medicine, nursing, and health sciences. The initial search yielded 544 documents. After applying predefined eligibility criteria, 166 articles were included for bibliometric analysis. The document selection process is illustrated in the PRISMA 2020 flow diagram.

Article metadata were exported in CSV format and analysed using the Bibliometrix package in RStudio and VOSviewer. Bibliometrix was used to perform descriptive and performance analyses, including publication trends, source and author productivity, citation analysis, and thematic evolution. VOSviewer was employed to construct and visualise bibliometric networks, including keyword co-occurrence, co-authorship, and country collaboration maps. These analyses enabled the identification of publication patterns, knowledge structures, and emerging research themes within the field.

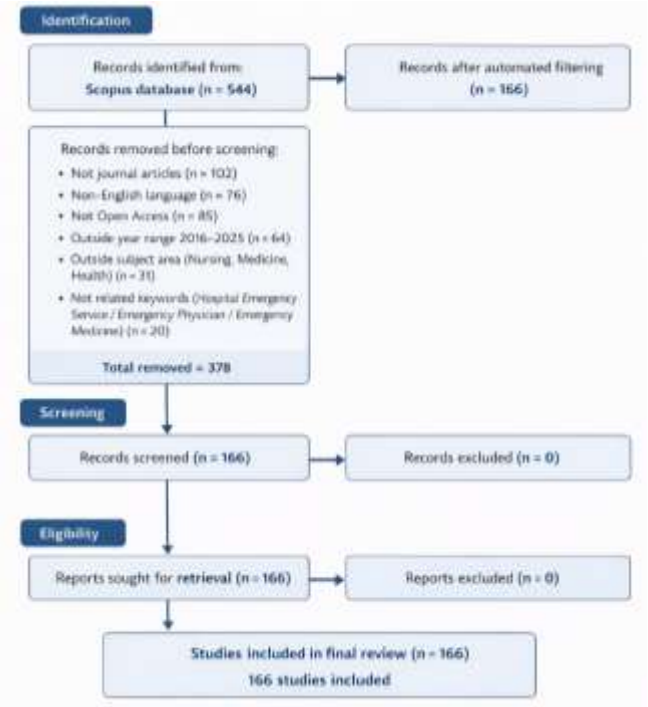

Figure 1. Research Flow

RESULTS

To provide a comprehensive overview of global research trends on physician response times in Emergency Department (ED) settings, a bibliometric analysis was conducted using scientific publications indexed in the Scopus database. This analysis covered the period from 2016 to 2025 and focused on open-access, English-language journal articles. The selected timeframe was intended to capture recent developments in the field over the past decade,

particularly in response to the increasing complexity of emergency care and ongoing transformations of the global healthcare systems.

Table 1. Main Information About Data

Description	Results
Main Information About Data	
Timespan	2016-2025
Sources (Journals, Books, etc)	91
Documents	166
Annual Growth Rate %	16,18
Document Average Age	4,76
Average citations per doc	13,2
References	13705
Document Contents	
Keywords Plus (ID)	1678
Author's Keywords (DE)	497
Authors	
Authors	1188
Authors of single-authored docs	2
Authors Collaboration	
Single-authored docs	2
Co-Authors per Doc	7,37
International co-authorships %	15,66
Document Types	
Article	166

Bibliometric analysis identified 166 publications from 91 journals on physician response times in Emergency Departments (Eds) between 2016 and 2025. An annual growth rate of 16.18% indicates a steady increase in publication output throughout the study period. These publications received an average of 13.2 citations per document and collectively cited 13,705 references. The average document age of 4.76 years suggests that this research area has developed relatively recently. The dataset comprised 1,188 authors, with an average of 7.37 authors per article, indicating a high level of research collaboration. However, international collaboration accounted for only 15.66% of publications, suggesting that cross-national research partnerships remain relatively limited within this field.

Furthermore, the high number of Keywords Plus (1,678) compared to Author's Keywords (497) reflects the complexity and diversity of research themes within this field. The fact that all publications were journal articles, demonstrates the dominance of empirical studies that have undergone a rigorous peer-review process, thereby enhancing the credibility of the research domain. Overall, these findings indicate that research on physician response time is a rapidly developing field with substantial scientific contributions. Nevertheless, there remains considerable potential to strengthen international collaboration and foster a more comprehensive integration of research themes.

Annual publication trends related to physician response times in Emergency Department between 2016 and 2025 exhibited a fluctuating yet overall upward trajectory. During the initial period (2016–2018), publication output remained relatively low, ranging from 7 to 11 documents per year. Research productivity increased during 2019–2020, reaching 25 publications in 2020. A subsequent decline was observed in 2021–2022, with 19 publications reported each year, followed by a modest increase to 21 publications in 2023. Publication output then decreased to 12 documents in 2024 before reaching its highest level in 2025, with 27 publications. Overall, this trend reflects sustained growth in scientific output concerning physician response time in Emergency Department settings throughout the study period.

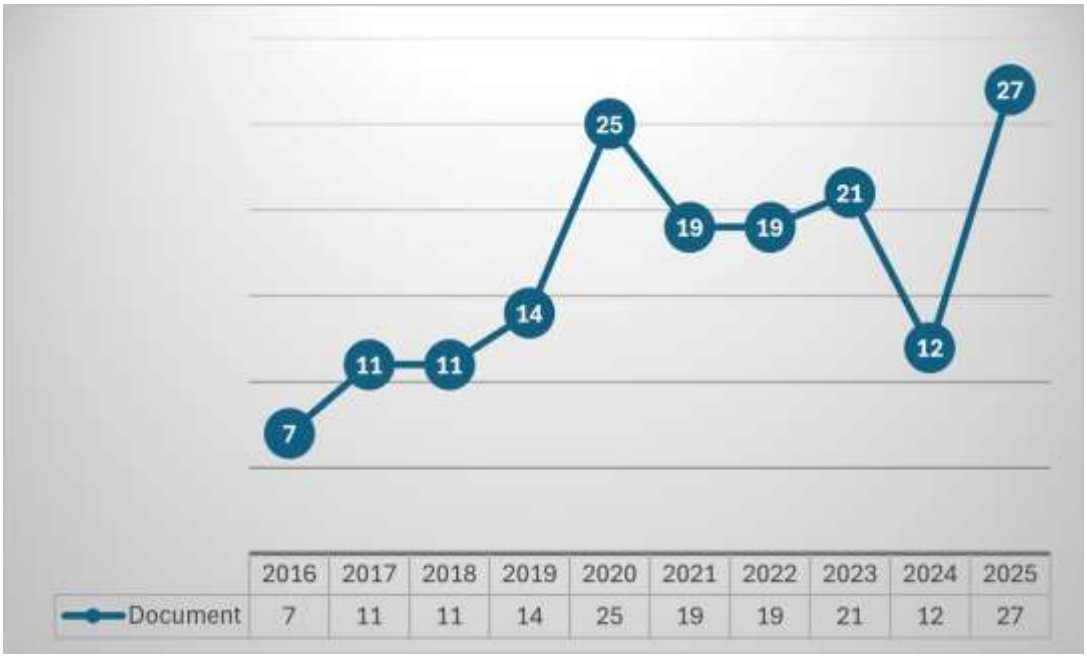

Figure 2. Publications by Year

An analysis of authors' publication output over time on the topic of physician response times in the Emergency Department reveals a heterogeneous distribution of productivity, with contributions unevenly distributed among authors. Several prominent authors appear to have maintained longer and more consistent publication trajectories, highlighting their roles as key contributors to the development of this research field. These authors have not only been active over an extended period but have also produced a relatively higher volume of publications than their peers, thereby contributing to the advancement of the field's conceptual and methodological foundations. In contrast, another group of authors demonstrates more sporading publication activity, characterized by shorter periods of contribution and a limited number of publications. This pattern may reflect collaborative involvement in specific research topics or participation during periods of heightened interest in issues such as emergency service efficiency. Overall, the observed distribution suggests a research landscape driven by a core

group of established contributors, supported by a broader network of authors who contribute to particular themes or emerging areas of inquiry.

Furthermore, the temporal distribution indicates that author productivity increased substantially after 2019, consistent with the overall growth trend in publication output. This finding suggests an expansion of the scientific community and increased collaboration in research examining physician response time as a key indicator of emergency service performance. Overall, the structure of author productivity in this field reflects a combination of sustained contributions from core authors and intermittent contributions from supporting authors. This pattern suggests that the development of research on physician response times in the Emergency Department is driven by a dynamic collaborative network, with significant contributions from a group of key researchers who maintain long-term continuity in this area of study.

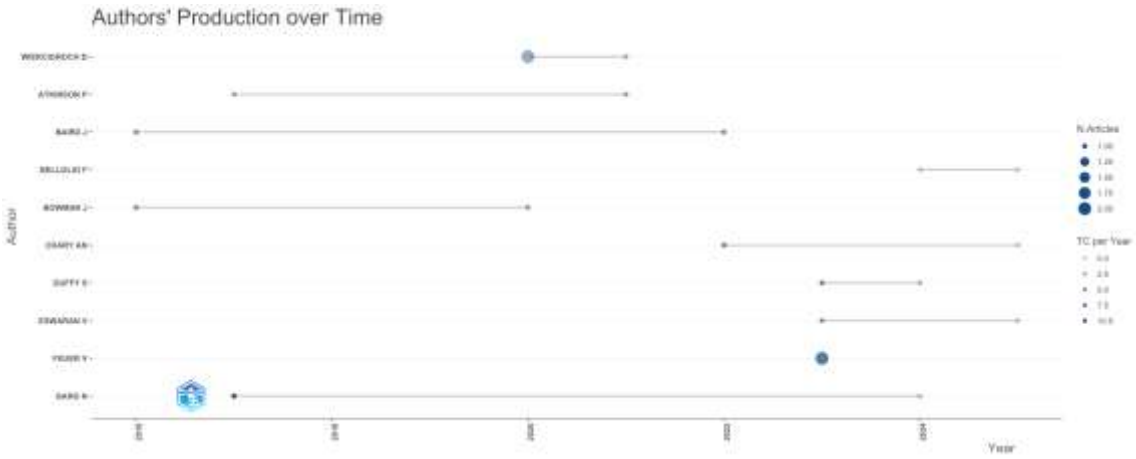

Figure 3. Authors' Production over Time

Based on the geographical distribution of publications, research on physician response times in the Emergency Department exhibits an uneven distribution of contributions accross countries. The United States accounts for the largest share of publications, contributing the highest number of documents in the dataset, followed by countries such as the United Kingdom, Turkey, and Australia. This distribution suggests that these countries are among the leading contributors to the advancement of research in this field. Furthermore, the United States demonstrates a prominent position within international collaboration networks, reflecting its central role in global research connectivity.

Other countries, including Canada as well as several European and Asian nations, contribute smaller number of publications and exhibit varying levels of international collaboration. These differences are evident in both publication output and collaborative engagement, highlighting disparities in research participation and scientific influence across

countries. Overall, the findings indicate that research on physician response times in the Emergency Department remains concentrated in a limited number of countries, while broader international participation continues to emerge.

Figure 4. Publications by Country

An analysis of the keyword co-occurrence network revealed that research on physician response times in the Emergency Department is primarily organized around broad themes related to emergency care systems. Terms such as "*hospital*," "*emergency service*," "*emergency*," and "*physician*" occupy central positions within the network, indicating that the existing literature predominantly focuses on emergency care processes and clinical service performance. Keywords specifically associated with family psychological outcomes were not among the most dominant terms, suggesting that the psychological experiences of patients' families remain a relatively underexplored dimension within the current research landscape. Nevertheless, related concepts may appear as emerging or peripheral themes, highlighting a potential gap in the literature and an important avenue for future research.

The second cluster represents managerial and service quality dimensions, characterized by the prominence of keywords such as 'quality improvement', 'patient safety', and 'resource management'. This pattern suggests that physician response time is increasingly recognied as a strategic performance indicator that is closely associated with healthcare system efficiency and patient safety outcomes. Another cluster reflects the clinical and operational dimensions of emergency care, as indicated by terms such as "*triage*", "*clinical decision-making*", and "*workflow*", highlighting the importance of optimising clinical processes to improve the timeliness physician responses.

Furthermore, the presence of methodological keywords such as "*observational study*" and "*cross-sectional study*" underscores the predominance of empirical approaches in

examining this phenomenon. The strong interconnection among the clusters suggest a high degree of multidisciplinary integration across clinical, managerial, and methodological domains. Overall, the network structure reflects the evolution of research towards a more systemic and integrated approach, emphasizing improvements in service quality, operational efficiency, and patient safety within the Emergency Department.

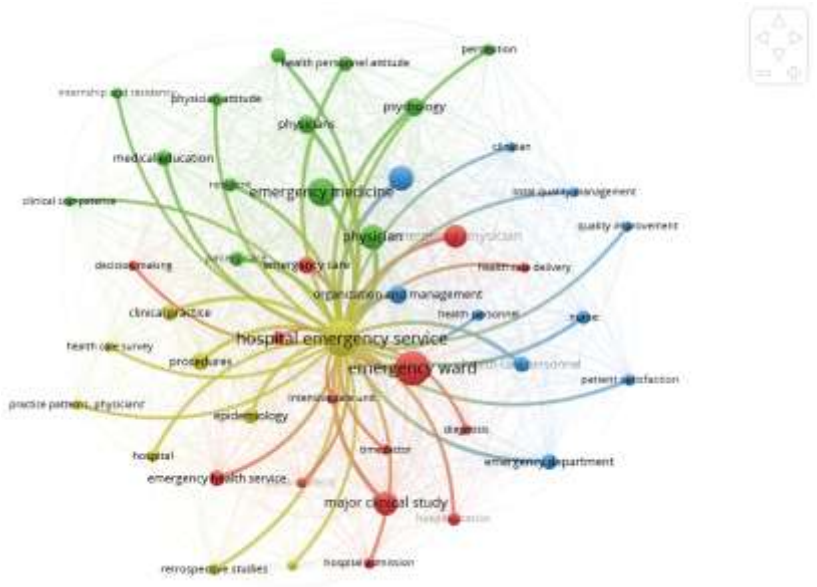

Figure 5. Network Mapping by Keyword

An analysis of the overlay visualization on the bibliometric map illustrates the temporal evolution of research themes related to physician response times in the Emergency Department. The earlier phase of research was predominantly characterized by clinical and operational themes, including "*clinical assessment*", "*emergency health services*", and practice-related concepts. More recent publications demonstrate the emergence of broader quality-oriented themes, reflecting an expanding research focus on service performance and healthcare quality, and patient-centred care.

However, themes specifically related to family psychological outcomes are not prominently represented in the keyword evolution map, suggesting that this dimension remains relatively underexplored within the current body of literature. This finding highlights a potential research gap and indicates the need for further investigation into the psychological experiences and well-being of patients' family members in the context of Emergency Department care.

Subsequently, the intermediate phase was characterized by greater diversification and multidisciplinary integration, marked by the increasing prominence of keywords such as "*emergency medicine*", "*physician*", and "*organisation and management*". The emergence of

terms related to mental health and psychology suggests a broadening of the research perspective, reflecting increased recognition of human and organisational factors as important determinants of physician response time.

In the current phase, the research landscape is dominated by strategic themes such as "*quality improvement*", "*total quality management*", "*patient satisfaction*", and "*emergency department*". The prominence of these themes indicates a paradigm shift toward a systemic approach that positions physician response time as a key performance indicator in the evaluation of service quality and patient safety. Overall, this evolutionary pattern highlights a transition from a predominantly descriptive perspective to a more comprehensive and integrated analytical framework.

These developments reflect the growing complexity of Emergency Department service system, as well as the need for quality-driven process optimization to enhance operational efficiency, service effectiveness, and clinical outcomes.

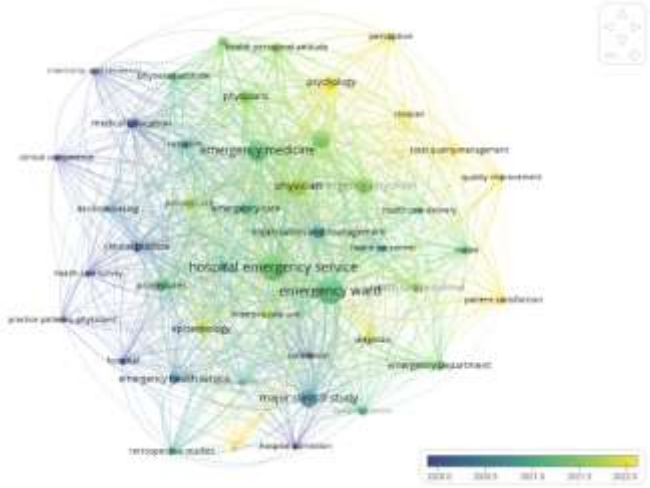

Figure 6. Development of Physician Response Time and the Emergency Department

Density visualisation analysis of the bibliometric map reveals a distribution of keyword intensity, reflecting the structure of knowledge concentration within research on physician response times in the Emergency Department. The highest density was observed for core terms such as 'hospital emergency service', 'emergency', 'physician' and 'emergency medicine', confirming that the primary focus of the literature remains centred on the clinical and operational dimensions of emergency care. Furthermore, the high intensity of keywords such as 'emergency ward' and 'major clinical study' indicates the predominance of a clinically-oriented empirical approaches in the evaluation of physician response times. The presence of terms such as 'organisation and management', 'time factors', and 'health personnel' suggests that systemic and workforce-related factors are increasingly being recognized as important determinants of service response performance.

Meanwhile, keywords related to quality improvement, such as ‘quality improvement’, ‘total quality management’, and ‘patient satisfaction’, appear with relatively lower frequency. This finding suggests that, although a quality-oriented perspective has begun to gain attention, it remains complementary rather than central within the current research landscape. Overall, the observed density distribution indicates that studies on physician response times in the Emergency Department continue to be dominated by clinical and operational perspectives, while also demonstrating a growing trend toward the integration of managerial and service quality dimensions. These findings underscore the importance of strengthening systems-based and quality-based research to support performance optimization and improve healthcare outcomes.

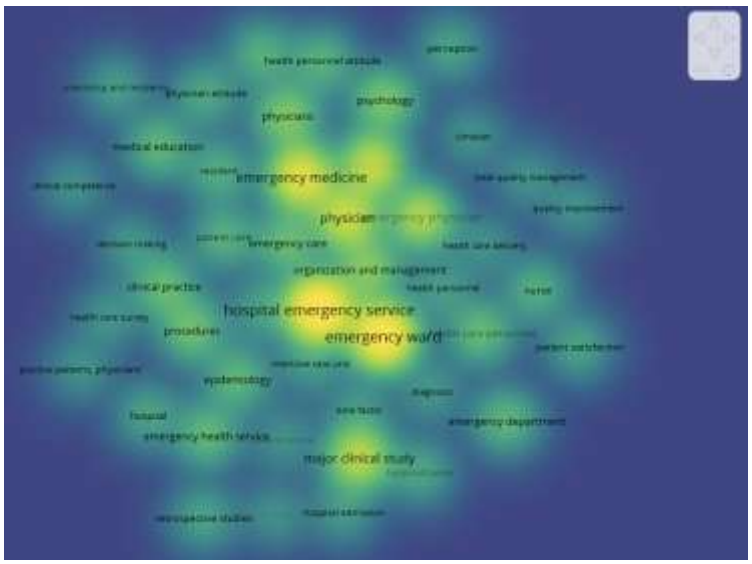

Figure 7. Physician Response Time and the Emergency Department overlay visualization (2016-2025)

DISCUSSION

This study reveals that research on physician response times in the Emergency Department (ED) has experienced substantial growth over the past decade, as evidenced by an annual growth rate of 16.18%. This increase reflects the growing global emphasis on the efficiency of emergency care services as a critical component of modern healthcare systems. This trend is closely associated with the increasing burden of patient visits and persistent challenge of ED overcrowding, both of which directly affect the quality of care and patient safety. Previous studies have confirmed that overcrowding in emergency departments can prolong waiting times, reduce service quality, and increase the risk of adverse events (Jones et al., 2021; Mosleh et al., 2025). Furthermore, the shift toward patient-centred care has contributed to the growing body of research in this area , with the experiences of patients and

their families increasingly recognized as important indicators of healthcare quality (Langford et al., 2021).

One of the key findings of this study is the progressive evolution of research focus from an operational perspective to a more holistic approach. In its early stages, the literature was dominated by efficiency-related indicators, such as waiting time and length of stay. More recent studies have expanded their focus to patient-centred outcomes, including service quality and patient satisfaction. However, family psychological outcomes remain limited and underrepresented within the current body of literature.

This shift suggests that physician response time is no longer viewed solely as an operational performance indicator but is increasingly recognized as an important determinant of the emotional experiences of patients' family members. This interpretation is consistent with findings that families in emergency settings often experience high levels of anxiety due to uncertainty, inadequate communication, and delays in receiving information (Riegel et al., 2025).Although these findings are consistent with the majority of the literature emphasising the importance of physician response time in improving service quality, several important considerations warrant attention. Some previous studies have suggested that increased service speed does not necessarily translate into higher-quality care, particularly when trade-offs exists between efficiency and patient safety (Afonso et al., 2024).

Furthermore, variations in healthcare systems across countries may influence the generalizability of findings, as resource-constrained settings face structural challenges that differ substantially from those encountered in high-income countries. Therefore, while the relationship between physician response time and service outcomes appears to be generally consistent, the contextual environment remains a critical determinant of its effectiveness. These findings suggest that a universal approach to improving physician response times may be inadequate without accounting for contextual and systemic factors.

This study contributes to the literature by broadening the framework for understanding physician response time, moving beyond its traditional role as an operational metric to a multidimensional construct encompassing clinical, managerial, and psychosocial dimensions. The inclusion of family psychological outcomes offers an additional perspective for mapping the research landscape of emergency care. Although this dimension remains underrepresented, its identification highlights a promising avenue for future empirical research aimed at integrating service efficiency with family-centred considerations in healthcare quality assessment.

From a practical perspective, these findings underscore the importance of viewing physician response time as a component of broader emergency care quality improvement initiatives. The growing attention to this research area highlights the need for healthcare organisations to strengthen monitoring and evaluation strategies related to timeliness and service performance. Moreover, the limited representation of family psychological outcomes in the existing literature points to an opportunity for healthcare providers and researchers to further explore family-centred approaches in emergency care. Future initiatives may benefit from integrating operational performance improvement with effective communication and psychosocial support strategies to facilitate more comprehensive evaluations of emergency care quality.

Furthermore, this study highlights opportunities for the development of more rigorous and methodologically robust research. Future studies should address the identified gap regarding the limited examination of family psychological outcomes in emergency care by investigating family-centred and psychosocial dimensions of service quality more comprehensively. A mixed-methods approach may be particularly valuable, integrating quantitative measures, such as physician response times and clinical indicators, with qualitative evidence derived from family experiences. In addition, the development of predictive models using artificial intelligence and machine learning represents a promising area of future inquiry, with potential applications in optimizing triage processes and supporting clinical decision-making (Porto, 2024). Cross-national comparative studies are also needed to examine how healthcare system characteristics influence variations in physician response times across different settings. Furthermore, family-centred care interventions should be evaluated through experimental or quasi-experimental designs to identify effective strategies for reducing family anxiety in the Emergency Department environments.

Overall, the bibliometric evidence suggests that future transformation of Emergency Department services should extend beyond conventional performance metrics focused solely on speed and efficiency. The identified research trends indicate the need for a multidimensional evaluation framework incorporating operational performance, clinical outcomes, technological innovation, and psychosocial experiences. Therefore, this study proposes three strategic priorities for future research and practice: (1) integrating family psychological outcomes into emergency service evaluation frameworks, (2) strengthening interdisciplinary and cross-national research collaboration, and (3) implementing adaptive digital technologies to support timely and patient-centred emergency care. These priorities provide a foundation for future

research and policy development aimed at advancing emergency healthcare systems that are both operationally efficient and responsive to the needs of patients and their families.

CONCLUSION

This study presents a bibliometric analysis of the global development of research on physician response times in the context of the Emergency Department, revealing increasing publication trends and evolving research themes over the past decade. The findings indicate that the literature has predominantly focused on operational performance indicators, including waiting time, length of stay, and emergency care efficiency, while broader patient-centred themes have gradually gained attention. However, family psychological outcomes remain relatively underrepresented within the current research landscape, highlighting an important gap for future investigation. Therefore, physician response time should be viewed not only as an operational performance indicator but also as a component of the broader framework of emergency care quality and patient- and family-centred care.

Nevertheless, this study has several limitations, including the use of a single database (Scopus), restrictions to English-language and open-access publications, and reliance on bibliographic metadata, which may limit the depth of contextual interpretation. Future research should address the identified gap by further exploring family psychological experiences, communication processes, and psychosocial dimensions related to emergency care. In addition, comparative studies across different healthcare settings and countries may provide deeper insights into variations in research priorities, healthcare system characteristics, and emergency care practices. Overall, advancing Emergency Department services requires an integrated approach that balances operational performance with human-centred aspects of care to support more responsive, patient- and family-oriented healthcare systems.

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