Bibliometric Study on Geriatric Emergencies: Intellectual Structure, Prominent Themes, and Future-Directing Topics

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ABSTRACT

Objective: This study aims to identify the intellectual structure, prominent themes, and diseases associated with geriatric emergency care. Additionally, it seeks to establish research questions for future studies.

Material and Methods: Co-citation and co-occurrence analyses were conducted for bibliometric evaluations. The Web of Science database was utilized. Diseases mentioned in 939 articles were identified through thematic coding analysis of abstracts and titles. Finally, questions for the future agenda were prepared. Bibliometric analyses were carried out using R-based Bibliometrix software.

Results: Co-citation analysis revealed two main themes: "Adverse Outcomes in Elderly Post-Emergency Service, Delirium Identification, and Multidisciplinary Interventions" and "Diagnosis and Management of Cognitive Dysfunction in Elderly Emergency Department Patients." Co-occurrence analyses indicate that the literature clusters around key themes such as "risk and prevalence," "management and epidemiology," "physical performance," "elderly care and outcomes," "elderly and community," "survival and prognosis," and "stroke and related diseases." According to the list of diseases, the ten most frequently studied diseases in geriatric emergency articles are, in order, Cancer, Stroke, Dementia, Depression, Delirium, Alzheimer's, Carcinoma, Metabolic Syndrome, Type 2 Diabetes, and Heart Failure.

Conclusion: Adopting a comprehensive approach is essential for improving older adults' quality of life and independence. Healthcare providers and decision-makers should take these findings into consideration, as they make significant contributions to the health and independence of the elderly population. Furthermore, questions for future research agendas have been formulated.

Keywords: Geriatric Emergency, Geriatric Trauma, Elderly, Bibliometric Analysis, Thematic Coding, Future Agenda

INTRODUCTION

The aging population worldwide poses a significant challenge for healthcare systems, especially in the emergency department (ED), where the elderly population often presents with complex medical issues. Older adults are at higher risk for adverse outcomes, including long hospital stays, functional decline, and death (1). Delirium, altered mental status, and confusion are common presenting symptoms in the elderly population visiting the ED and thus require specialized care and assessment, such as cranial computed tomography (CT) (2). Additionally, the ED plays a critical role in detecting elder abuse, a significant and unrecognized problem in the elderly population (3).

Therefore, efforts to improve experiences, outcomes, and the application of customized care for older adults in emergency departments are becoming increasingly important. Topics such as the application of geriatric screening in the emergency department using a consolidated framework for implementation research in emergency services in Flanders, Belgium (4), how telehealth applications can support post-emergency department care for the elderly (5), and the impact of discharging and following up elderly patients from the emergency department on healthcare usage (6) are addressed.
An aging population presents new and specific challenges for emergency departments. The growing elderly population worldwide necessitates a better understanding and management of the special needs of geriatric patients by emergency services. For example, lower acuity levels among older adults often result in more emergency department visits and hospital admissions. Furthermore, this population generally has specific health needs that could be associated with multiple illnesses, functional ability loss, polypharmacy, and other age-related changes. Therefore, geriatric emergency medicine is an area that needs continuous development to meet the special needs of older adults in this critical sector of healthcare services.

Emergency departments are critical environments faced with various adverse outcomes and risk factors for older adults. Older adults have frequently encountered patients in emergency departments, and using emergency services can lead to increased adverse outcomes and hospital admissions. Specific risk factors and screening tools can predict these adverse outcomes and hospital admissions. Delirium is a common and severe complication in emergency department visits for older adults, and screening and diagnosis of delirium can reduce adverse outcomes and hospital admissions. Moreover, innovations in geriatric emergency departments can reduce hospital usage and improve the quality of emergency care. However, implementing these effective interventions and innovations requires changes at the health system level and the diagnosis and management of delirium are critical for improving the quality of care for elderly patients in emergency departments.

The research has two main contributions. Firstly, considering a researcher's subjective ability and biases to evaluate the GAS field has helped to identify the field's current development patterns and limitations. Secondly, understanding academic discussions in the GAS field has provided valuable information about the authors, countries, and institutions, common citation analysis themes, and common keyword analysis themes, thus contributing to identifying gaps that will guide future research.

The article is divided into five sections. We start with the methodology by outlining the main lines of the research technique in the second section. The results obtained from the analysis are presented in performance analyses, bibliometric analyses, and Section 3. In Section 4, we discussed the findings. In this section, we also included the limitations of the research and recommendations for future research. Finally, we concluded the research with the conclusion section.

**MATERIAL and METHODS**

Bibliometry is based on a methodology that statistically analyzes publications using various metadata and features. This provides a general overview of scientific developments in research and is extremely valuable for scientists. Additionally, this analysis helps objectively, empirically, and impartially evaluate the research's productivity and contribution to knowledge development. The Web of Science (WoS) database, often preferred for literature reviews and bibliometric analyses, has been used in this study. WoS is a leading platform for scientific citation research, discoveries, and analyses and serves as a comprehensive data source for various applications, from extensive data analyses to academic studies. This platform includes millions of bibliographic records, billions of citation links, and thousands of additional articles. A complete summary of the analysis process is depicted in Figure 1.

On May 1, 2023, publications related to "geriatric medicine" were searched in the Web of Science (WoS) database, and after applying various filtering strategies, a total of 937 publications were obtained. These data were analyzed using the R-based, open-source Bibliometrix software. Firstly, a performance analysis was conducted, which included the basic statistics of these articles, their authors, the number of publications, their journals, institutions, and countries. Later, a scientific map included a co-citation network and co-occurrence analysis. The analysis was conducted without word merging. In the final stage, article summaries and titles were scanned, and recurring disease names were counted once to create a list of diseases. This final list created a new table, categorized according to medical specialties.
RESULTS

In this section, we initially conducted a performance analysis concerning the number of publications and citation amounts in the field of geriatric emergency based on 937 articles. In the second stage, we visualized the field of geriatric emergency through co-citation and co-word analyses.

1. Performance Analysis

The data includes 937 documents obtained from 78 different sources (journals, books, etc.) between 1992 and 2022. The annual growth rate is 12.44%, the average age of the articles is 6.13 years, and the average citation per article is 7.033.

A total of 22,979 references are present. There are 3,388 authors, 22 of whom are the authors of solely single-authored documents. In the section on collaboration between authors, the number of single-authored documents is 27, the average number of authors per document is 5.45, and the international collaboration rate is stated as 8%. Among the types of documents, there are 849 articles and 88 reviews. Figure 2, prepared concerning the performance of the publications, is presented below.
Figure 3 shows the changes in the number of articles published and the number of citations received between 1992 and 2022. The number of articles is relatively low from 1992 until 2010 but shows a significant increase from 2010 onwards, reaching 101 in 2022. This indicates a growing interest and research activity between 2010-2022. However, while the number of citations is 236 in 1992, it peaks at 733 in 2018 and subsequently declines to 116 in 2022. This suggests that the studies in the mentioned field received increasing attention up to 2018, but interest and impact have decreased between 2019 and 2022.

This table will not cover all the studies listed. Instead, it will discuss the top three most-cited studies. In the most-cited study, Hwang and Morrison emphasize that the current structure and service processes of emergency departments (EDs) are not compatible with the specific needs of elderly patients. They underline the necessity for targeted interventions and modifications in the care of these elderly patients (40).

In the second most-cited study, the goal is to assess the current state of emergency medicine specialists about clinical, educational, social, ethical, and resource issues concerning the care of elderly patients. The results indicate that emergency department doctors anticipate that the aging population will significantly affect the availability of hospital and intensive care unit beds. They also find that managing elderly patients is more challenging than younger patients and that the majority believe there is insufficient research, continuous medical education, and residency training in geriatric emergency medicine. These findings suggest that emergency medicine specialists’ discomfort regarding elderly patients could stem from inadequate education, research, and continuous training in geriatric emergency medicine (41).

The third most-cited study aims to help emergency departments (EDs) consider the specific needs of elderly patients to improve patient care quality. The authors have chosen three scenarios with quality deficiencies in the care of elderly patients—cognitive assessment, pain management, and transitions between nursing homes and EDs in both directions. They have developed potential quality indicators for each scenario. These quality indicators will assist researchers and clinicians in targeting their quality improvement efforts (42). More information about the most cited authors can be found in Table 1.

Figure 3: Number of Publications and Citations by Years

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Table 2 displays the authors, journals, institutions, and countries with the most publications in the field of geriatric emergency care. SHIH SC has contributed 30 publications in this area, indicating his significant contributions to the field. Other authors have also made substantial contributions. The "International Journal of Gerontology" stands out as the journal with the most publications in this field, featuring 741 articles, while other journals have published fewer articles. Mackay Memorial Hospital has the most publications, totaling 514 articles, and it is followed by other notable institutions such as Taipei Medical University, National Yang Ming Chiao Tung University, and National Taiwan University. International institutions like Harvard University and the Icahn School of Medicine at Mount Sinai have also made significant contributions.

China is the leading country with 1,893 publications, followed by the United States with 580 publications. Japan, South Korea, and Turkey also play important roles in research in this area. Canada, Australia, the Netherlands, Italy, and Belgium also possess significant research in this domain. Generally, more developed countries have a higher proportion of elderly populations, leading to more research on geriatric emergencies in Europe and North America. Asian countries are increasing their research in this field due to their aging populations. Conversely, in Africa and South America, where younger populations are more prevalent, there is less research conducted on geriatric emergency care.

### Table 2. Top Publishing Authors, Sources, Institutions, and Countries

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<th>Authors</th>
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<td>SHIH SC</td>
<td>30</td>
<td>International Journal of Gerontology</td>
<td>741</td>
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<tr>
<td>CHANG WH</td>
<td>28</td>
<td>Academic Emergency Medicine</td>
<td>18</td>
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<td>YEH HI</td>
<td>26</td>
<td>American Journal of Emergency Medicine</td>
<td>15</td>
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<td>HWANG U</td>
<td>24</td>
<td>Journal of The American Geriatrics Society</td>
<td>15</td>
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<td>CHEN MJ</td>
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<td>Annals of Emergency Medicine</td>
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<tr>
<td>CHEN YJ</td>
<td>20</td>
<td>BMC Geriatrics</td>
<td>7</td>
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<td>CHANG CW</td>
<td>19</td>
<td>Emergency Medicine Clinics of North America</td>
<td>7</td>
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<tr>
<td>CARPENTER CR</td>
<td>18</td>
<td>Age and Ageing</td>
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<td>Cureus Journal of Medical Science</td>
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<td>CHEN CY</td>
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<td>Journal of Emergency Medicine</td>
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### Country

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<tr>
<td>Mackay Medical College</td>
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<tr>
<td>Taipei Medical University</td>
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<tr>
<td>Mackay Junior College of Medicine, Nursing and Management</td>
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<tr>
<td>National Yang Ming Chiao Tung University</td>
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<tr>
<td>National Taiwan University</td>
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<tr>
<td>Harvard University</td>
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<td>ICAHN School of Medicine At Mount Sinai</td>
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<tr>
<td>China Medical University Taiwan</td>
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<td>National Taiwan University Hospital</td>
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2. Scientific Mapping

In this section, co-citation and co-occurrence analyses have been performed. By using the emerging color clusters, the name of each color has been determined, and its relevance to the subject of Geriatric Acute Services (GAS) has been elucidated.

### Co-Citation Analyses

**Cluster 1 (Red Cluster):** Thematically, this could be broadly termed as "Adverse Outcomes in Elderly Post-Emergency Department (ED), Delirium Identification, and Multidisciplinary Interventions.” Extended content of the theme: Elderly individuals have frequently encountered patients in emergency departments, and ED utilization can lead to increased adverse outcomes and hospital admissions for older adults (12,13). However, these adverse outcomes and hospitalizations can be predicted by specific risk factors and screening tools (14,15). For example, geriatric assessment and multidisciplinary interventions can improve outcomes for elderly adults post-ED (43–46). Delirium is a common and serious complication during ED visits for older adults, and delirium screening and diagnosis can reduce adverse outcomes and hospital admissions (16,17).

Additionally, innovations in geriatric emergency services can reduce hospital usage (18,19) and improve the quality of emergency care (20–23). However, implementing these effective interventions and innovations requires changes at the healthcare system level (24–29). In summary, this theme focuses on identifying adverse outcomes post-ED for elderly adults, diagnosing delirium, identifying risk factors, and developing and implementing effective interventions and innovations. In this context, the proposed theme will contribute to the future direction of geriatric emergency care and improve post-ED outcomes for older adults.
The Theme (Figure 4): This theme discusses adverse outcomes, risk factors, and recommended multidisciplinary approaches for elderly emergency department patients. Elderly patients are a frequent and specialized demographic in emergency departments, thus making this topic highly important. Most cited articles focus on problems faced by elderly patients in emergency departments, adverse outcomes, and interventions. For example, McCusker et al. (14) provide a screening tool for determining the risk of adverse health outcomes after an emergency visit, while Caplan et al. (43) explore the impacts of comprehensive geriatric assessments and multidisciplinary interventions following emergency department discharge. Hwang et al. (18) have worked on emergency department innovations and hospital usage for the elderly. Also, Conroy et al. (46) have evaluated a geriatric assessment method in emergency departments called the 'Emergency Frailty Unit.' Therefore, most of these articles have been selected to fit themes of adverse outcomes, risk factors, and multidisciplinary approaches for this group. This theme aims to fill gaps by providing information on how emergency healthcare services can be optimized for elderly patients.

Cluster 2 (Blue Cluster) “Diagnosis and Management of Cognitive Impairment in Elderly Emergency Patients”: Content of Theme: Elderly individuals are at high risk for neurological conditions like cognitive impairment and delirium (30,31). Emergency departments must be capable of effectively dealing with these issues. Hogan et al. (47) have conducted a study examining the consensus process for developing geriatric competencies for emergency medicine specialists. These competencies address the special needs and challenges faced by elderly patients in emergency departments. Delirium is frequently encountered during emergency visits by elderly patients and often goes unrecognized (48). Therefore, Carpenter et al. (49) and Hustey et al. (50) have conducted studies evaluating different screening tools to detect cognitive impairment. Furthermore, Kakuma et al. (51) have examined the effects of delirium on survival among elderly emergency patients who were sent home. Also, Terrell et al. (52) have evaluated the efficacy of a computerized decision support system in reducing potentially inappropriate prescriptions for elderly emergency patients. This work helps develop strategies to reduce the use of potentially harmful medications in the elderly. Lastly, identifying fall risk factors among emergency patients is also important for the elderly (53). Falls are a significant cause of injuries and deaths among the elderly.

In conclusion, diagnosing and managing cognitive impairment in elderly emergency patients are critically important for improving the quality of care they receive in emergency departments (32). Therefore, emergency department staff must have competencies tailored to the special needs and challenges of elderly patients (54).

Collective Assessment for Eight Themes with a Single Member: Elderly individuals require evaluating and managing cognitive functions, daily living activities, and physical conditions to maintain health and independence in later stages of life. Therefore, the cognitive and functional assessments of the elderly are crucial components of elderly care.

• Folstein et al. (55) developed a method called "Mini-Mental State," which offers a practical way to assess the cognitive status of patients clinically. This aids clinicians in quickly and effectively evaluating patients' cognitive functions.

• Similarly, Mahoney and Barthel (56) have introduced the Barthel Index, a simple index for assessing independence in individuals with chronic illness during rehabilitation.

• Charlson et al. (57) have studied why predictive indices show lower performance in validation studies. This work discusses the limitations and potential improvements of current methods used in evaluating elderly individuals.

• Lawton and Brody (58) have developed a method for assessing the daily living activities in the elderly. This method is critically important in developing strategies to improve older individuals' independence and quality of life.

• Fried et al. (59) have developed a phenotype for assessing frailty in older adults. This research is critically important for identifying and managing frailty in elderly individuals.

• Yesavage (60) has explored imaging and memory training methods to improve memory in the elderly. This research is important in developing strategies to enhance cognitive functions in older individuals.

In conclusion, the cognitive and functional assessment of elderly individuals is critically important when developing strategies to enhance their independence and quality of life. Therefore, research in this area significantly contributes to increasing the health and independence of elderly individuals (61).
Co-Occurrence Analysis:

Geriatric medicine is a critical branch of medicine focused on older adults’ health and disease management. In this context, the identified seven themes represent a comprehensive approach to improving older adults’ quality of life and independence. These themes encompass various aspects of the lives of older adults, such as health management, physical performance, elderly care and outcomes, community living, survival and prognosis, and stroke and related diseases.

Specifically, the themes related to risk and prevalence, management and epidemiology, physical performance, and elderly care and outcomes focus on the development of strategies and interventions to help older adults maintain healthy and independent lives. Additionally, the themes about community living, survival and prognosis, and stroke and related diseases involve the development of strategies to improve the likelihood of meaningful community living and post-disease survival for older adults.

Therefore, these seven themes represent the scope and objectives of geriatric medicine and should be considered holistically to improve older adults’ health and quality of life (Figure 5).

Cluster 1: Risk and Prevalence: This cluster includes concepts like "risk factors," "prevalence," "dementia," "population," "obesity," and "Alzheimer’s disease." These terms provide information about the prevalence of specific diseases (e.g., dementia and Alzheimer’s disease) in the population and their association with particular risk factors (e.g., obesity).

Cluster 2: Management and Epidemiology: This cluster encompasses terms such as "mortality," "management," "adults," "age," "health," "meta-analysis," "validation," "older people," "therapy," "prevention," "epidemiology," and "disability." These concepts are generally related to the health management of older adults, the aging process, disease prevention, and epidemiological studies.

Cluster 3: Physical Performance: This cluster includes terms like "performance," "balance," and "mobility." These concepts focus on individuals’ physical abilities, such as physical performance, balance, and mobility.


Cluster 5: The Elderly and Community: This cluster includes terms like "risk," "older adults," "people," "impact," "cognitive impairment," "frailty," and "community." These terms deal with themes like older adults, cognitive impairment, living in the community, and the impact of older adults on the community.

Cluster 6: Survival and Prognosis: This cluster includes terms like "survival," "cancer," and "predictors." These terms are related to post-disease survival in older adults, cancer, and disease prognosis factors.

Cluster 7: Stroke and Related Diseases: This cluster contains only the term "stroke." This focuses on stroke themes and associated risk factors and outcomes.

These clusters represent the main themes that should be considered when writing an article on geriatric medicine. Each cluster requires a detailed examination of critical themes that affect older adults’ health and quality of life.

List of Diseases

Visits to geriatric emergency departments are often due to specific emergencies and diseases experienced by older individuals. This complexity is compounded by the fact that older individuals often have multiple chronic diseases and experience declines in physical and cognitive functions. Table 3 shows the diseases most frequently studied in geriatric emergency medicine.
The data in the table offer a glimpse into the diseases frequently discussed in articles concentrating on geriatric medicine (elderly health). This helps us understand which diseases elderly individuals are commonly exposed to, aiding healthcare providers, policymakers, and researchers in prioritizing areas for prevention, treatment, and management within the elderly population.

The table shows that cancer, stroke, and dementia are the three most common diseases in the elderly population. These pose significant health challenges for older individuals and should be priority areas in both geriatric medical practice and research. Other significant diseases include depression, delirium, Alzheimer's, carcinoma, and metabolic syndrome. Each of these diseases can significantly impact the quality of life for older individuals and, therefore, should be carefully managed by specialists in geriatric medicine.

Other diseases listed in the table—such as type 2 diabetes, heart failure, sarcopenia, Parkinson's disease, hypertension, atrial fibrillation, dyslipidemia, cardiac arrest, atherosclerotic disease, sepsis, osteoporosis, acute appendicitis, thyroid diseases, adenocarcinoma, epilepsy, hyperkalemia, gout, and insomnia—are less frequent but still significant in the elderly population, requiring appropriate treatment and management. Because many diseases can be related to multiple organs or systems, they may be managed by more than one specialty. For instance, "Metabolic Syndrome" might involve endocrinology, cardiology, and general internal medicine. Also, as many older individuals have multiple chronic diseases, geriatric specialists often deal with various diseases. Human resource planning is necessary for diseases requiring consultation across multiple specialties.

### Future Agenda

Geriatric emergency services are critically important for meeting the growing needs of the aging population. Older patients often present with unique needs, including multiple comorbidities, fluctuating mental states, and mobility challenges. As such, the quality of emergency services provided for them can significantly impact their health outcomes. The questions listed above establish an agenda for future research in geriatric emergency services. These questions address critical issues such as:

1. How can we improve the emergency service experience for elderly patients?
2. How can technology and innovation be more effectively employed to enhance the emergency service experience for elderly patients?
3. How can telehealth be utilized more effectively to promote age-appropriate care?
4. How can geriatric emergency services become a more effective laboratory for innovation and improvement?
5. What are the impacts of the COVID-19 pandemic on the emergency service experience of elderly patients, and how can these effects be mitigated?
6. What are the various challenges faced by elderly patients in emergency services, and how can these challenges be overcome?
7. How can emergency services more effectively meet the diverse needs of the elderly population?
8. How should geriatric emergency medicine evolve to meet future needs?
9. What mobility aids and training are required to improve the emergency service experience for elderly patients?
10. How do emergency general surgical needs impact the emergency service experience of elderly patients, and how can this impact be improved?
11. How can the quality of services provided for elderly patients in emergency services be further enhanced?
12. What training should emergency service healthcare staff provide to understand the special needs of elderly patients better?
13. What technological innovations are required in emergency services for elderly patients?

14. How can the satisfaction of advisory teams in geriatric emergency medicine be increased?

15. What strategies should be implemented to facilitate easier access to emergency services for elderly patients?

16. How can we more effectively evaluate signs of delirium, changing mental states, and confusion in elderly patients in emergency services?

17. How do the challenges faced by elderly patients in emergency services affect their financial burdens, and how can these be alleviated?

18. How can service delivery and management in emergency services be optimized for elderly patients?

19. How can the experience of elderly patients in emergency services be improved in the context of diversity, equity, and inclusion?

20. How should the experience of elderly patients in emergency services be supported during extraordinary situations like pandemics?

The answers to these questions will provide valuable guidance for future research in geriatric emergency services and will offer practical strategies and orientations to improve the emergency service experience for elderly patients. The sources used to identify these questions are from 2023 and are based on ideas gleaned from the discussion sections of sources used in the first part of the discussion section, ensuring that future research is current and builds upon the most recent understandings of geriatric emergency care.

**DISCUSSION**

Articles focusing on geriatric emergencies have been analyzed with respect to various aspects, including performance analysis, co-citation, and co-occurrence analyses, the most frequently studied disease names in the articles, and formulating questions for future research. To gain academic significance from our findings, we compared the results obtained from the analyses with the content of the most recent publications in this section. Initially, numerous articles addressing the subject of geriatric emergency from 2023 will be assessed to determine how they frame and analyze the subject, followed by a comparison involving co-citation, co-occurrence analyses, and findings from the disease list.

The increasing elderly population worldwide poses a significant challenge for Emergency Departments (ED) because the elderly commonly present with complex medical issues, leading to prolonged hospital stays, functional decline, and increased risk of death(1). Frequent symptoms among elderly individuals visiting the ED include delirium, altered mental status, and confusion, requiring specialized assessments such as cranial computerized tomography (CT) scans to address their specific needs(2). In addition, EDs play a critical role in detecting elder abuse, a substantial and often unrecognized issue in the elderly population(3).

In this context, efforts to improve elderly individuals' ED experiences, outcomes, and specialized care practices are increasingly important. A survey study conducted in the Flanders region of Belgium investigated the development of geriatric screening practices in EDs, focusing on the availability of geriatric-friendly protocols, equipment, and the physical environment(4). Similarly, there are studies available on the use of telehealth applications to support post-ED care (5) and on the impact of the ED discharge process and follow-up on healthcare utilization by elderly patients (6).

The growing elderly population has unveiled new and specific challenges in EDs. As Kennedy and Liu pointed out, the global rise in the elderly population requires EDs to understand better and manage the unique needs of geriatric patients (7). A study by Solakoglu et al. demonstrated that lower acuity levels among elderly adults often lead to more frequent ED visits and hospital admissions (8). This demographic also has unique health needs associated with multiple diseases, loss of functional ability, polypharmacy, and other age-related changes (9,10). Therefore, geriatric emergency medicine requires ongoing development to meet the specialized needs of elderly adults in this critical healthcare domain (11).

EDs for older adults are critical environments with various adverse outcomes and risk factors. Elderly patients are frequently seen in EDs, and ED use can lead to increased adverse outcomes and hospital admissions (12,13). However, adverse outcomes and hospital admissions can be predicted through specific risk factors and screening tools (14,15). Delirium is a common and serious complication during ED visits for elderly adults, and screening and diagnosis of delirium can reduce adverse outcomes and hospital admissions (16,17). Additionally, innovations in geriatric emergency departments can decrease hospital usage (18,19) and enhance the quality of ED care (20,22,62,63). However, implementing these effective interventions and innovations requires changes at the healthcare system level (24–29). Additionally, elderly adults are at high risk for neurological conditions, such as cognitive dysfunction and delirium(30,31), and the diagnosis and management of cognitive dysfunction are critical for enhancing the quality of care that elderly patients receive in the ED (32).

Considering the 2023 publications concerning geriatric emergencies, it is observed that the following issues are prominent: Evaluation and Identification of Elderly Patients, Service Delivery and Management, Technology and Innovation, and Outcomes and Quality Control. These studies, explored under these main headings, present significant strategies and directions for improving the ED experiences of elderly adults. For example, Liu et al. (2) investigate CT findings of delirium, altered mental status, and confusion in elderly patients, while Patterson and Shah(64) discuss how geriatric EDs can be used as innovation laboratories, and McQuown et al. (5) explore how telehealth can be utilized to promote age-appropriate care. Furthermore, Moreines et al. (65) investigated patient satisfaction with a geriatric emergency medicine service consultation team led by an APRN.

Additionally, studies examining the themes of Clinical and Financial Outcomes, Diversity, Equity and Inclusion, History and Future Perspectives, Patient Experience, the COVID-19 Pandemic, Mobility Aids, and Education and Emergency General Surgery are also vital in understanding the various
challenges encountered by elderly adults in EDs and how these challenges can be overcome. Chary et al. (66) focused on how EDs meet the diverse needs of the elderly population; Bunney et al. (67) discussed the role of technology and innovation in enhancing the ED experience of elderly patients; and Hogan et al. (68) focused on the history of geriatric emergency medicine and future needs in this field. Kuxhause et al. (69) explore elderly patients’ experiences in the ED and how these experiences can be enhanced, Jazuli et al. (70) examine the impacts of the COVID-19 pandemic on elderly patients’ ED experience, and de Andrade Junior et al. (71) investigate demonstrating and educating on mobility aids for elderly patients in the ED. Lastly, Burney et al. (72) addressed the impact of emergency general surgery needs on elderly patients’ ED experience.

These studies can generally be said to have developed strategies and solutions to enhance the emergency service experience of the elderly population by addressing various aspects of this experience. Challenges encountered in emergency services, the role of technology and innovation, patient satisfaction and financial results, the effects of the COVID-19 pandemic, and issues such as mobility aids and education are the focus areas of studies. Each study contributes to developing strategies to improve the understanding of the emergency service experience of the elderly population and enhance this experience.

Evaluation in terms of Co-citation Analysis: While the main findings of the co-citation analysis focus on themes such as adverse outcomes in the elderly after emergency service, determining delirium and multidisciplinary interventions, and diagnosis and management of cognitive dysfunction in elderly emergency patients, recent studies published in 2023 have examined a wide range of themes such as evaluation and identification of elderly patients, service delivery and management, technology, and innovation, and outcomes and quality control. For instance, while co-citation analysis emphasizes the necessity of emergency service personnel with competencies suitable for the special needs and challenges of elderly patients, Patterson and Shah (64) discuss how geriatric emergency departments can be used as innovation laboratories. This demonstrates the potential of technology and innovation in enhancing the emergency service experience of elderly patients.

Additionally, while co-citation analysis addresses strategies to increase the capacity to identify and manage cognitive dysfunction and delirium in elderly individuals, Liu et al. (2) explored CT findings of delirium, altered mental status, and confusion in elderly patients. This shows that existing approaches to assessing and managing the cognitive function of elderly patients can be further developed through technological innovations and advancements. In the context of outcomes and quality control, co-citation analysis highlights the crucial significance of strategies aimed at enhancing the independence and quality of life of elderly individuals. Furthermore, Moreines et al. (65) investigated patient satisfaction with a geriatric emergency medicine service consultation team led by an APRN. This indicates that patient satisfaction is critical for assessing and improving the quality of the emergency service experience of elderly patients. Additionally, new themes, such as the impact of the COVID-19 pandemic, mobility aids, and education, have emerged in recent studies. Jazuli et al. (70) examine the impacts of the COVID-19 pandemic on the emergency service experience of elderly patients, and de Andrade Junior et al. (71) explore issues concerning demonstrating and educating on mobility aids for elderly patients in emergency departments.

In conclusion, co-citation analyses and recent studies have noticeable similarities and differences. Both groups developed strategies to improve the emergency service experience of elderly patients and focused on common themes such as cognitive dysfunction, delirium, and patient satisfaction. However, recent studies have also addressed new and emerging themes, such as the role of technology and innovation, the impacts of the COVID-19 pandemic, and mobility aids and education. Therefore, the findings of these studies will contribute to developing strategies to understand better and enhance the emergency service experience of the elderly population.

Evaluation from the Perspective of Co-occurrence Analysis: Recently published studies in geriatric emergency medicine in 2023 addressed various significant issues intending to improve the emergency service experience of elderly adults. These studies focus on key issues, such as assessing and identifying elderly patients, service delivery and management, technology and innovation, outcomes, and quality control. In parallel with the results of the co-occurrence analysis, main themes, such as risk factors affecting the health and quality of life of elderly adults, disease prevalence, physical performance, elderly care, social interaction, life post-illness, stroke risk and outcomes, have been emphasized again.

Recent publications have aimed to improve this experience by addressing the emergency service experience of elderly adults from a more specific perspective. These studies include detailed areas, such as how elderly patients will be assessed and identified during their application to emergency services, how service delivery and management will be optimized, the role of technology and innovation, monitoring outcomes, and quality control. For instance, it addresses issues such as the relationship between delirium and confusion in elderly patients with CT scan findings and the role of telehealth in promoting age-appropriate care. Furthermore, how geriatric emergency medicine service advisory teams and innovative labs can improve the emergency service experience of elderly patients is discussed.

Clinical and financial outcomes, diversity, equity and inclusion, impacts of the COVID-19 pandemic, patients’ experiences, mobility aids, and education are also focus themes in recent studies. These themes aim to understand and find solutions to the challenges faced by the elderly in emergency services. In this context, the diversity of the emergency service experiences of elderly patients, the effects of the pandemic, and future perspectives are also discussed.

The harmony between the results of the co-occurrence analysis and recent findings shows that it aims to comprehensively address all aspects of the emergency service experience of the elderly. These studies emphasize the need for a multidisciplinary approach to improve the health and quality of life of elderly patients. Both approaches offer a
broad perspective to understand better, assess, and optimize the emergency service experiences of elderly adults.

Evaluation In Terms of Identified Disease List: It is challenging to say that the studies conducted on geriatric emergencies, as of 2023, have a broader perspective on improving the emergency service experiences of elderly individuals and understanding the various challenges faced by the elderly population rather than focusing on a particular disease. When the most cited studies are examined (40-42), there are studies with the same concern. Only changes in time and technology have made more comprehensive and program-based approaches more pronounced. In 2023, a broader perspective has been adopted toward improving the emergency service experience of the elderly population (64,67,69). This situation emphasizes the importance of addressing the challenges and needs faced by the elderly population over time using a more holistic approach. The main areas of focus in these studies include challenges encountered in emergency services, the role of technology and innovation, patient satisfaction, financial results, the effects of the COVID-19 pandemic, and topics such as mobility aids and education (66,71).

This study had certain limitations. Firstly, research conducted using specific keywords may overlook results found in searches using different terms (73). Secondly, bibliometric analysis typically concentrates on cited articles, potentially neglecting other significant studies (33,36). Thirdly, this analysis was limited to the Web of Science database and excluded other databases (74,75). Lastly, each bibliometric technique and analysis unit had its own set of constraints. Future research should address these limitations.

CONCLUSION

This study undertakes an exhaustive analysis of pivotal themes within the domain of geriatric medicine, with a focus on factors affecting the health and quality of life of older adults. Through co-citation and co-occurrence analyses, the research identifies salient themes and issues requiring attention in various areas, such as adverse outcomes following emergency department visits, cognitive dysfunction, physical performance, geriatric care, and patient outcomes. These analyses are crucial for developing strategies and interventions to enhance healthy and independent living for older adults, improve their post-disease survival probabilities, and sustain meaningful community engagement.

Furthermore, attaining competencies aligned with the specific needs and challenges faced by older patients among emergency department staff is a critical determinant in elevating the quality of healthcare services for this vulnerable population.

In summary, adopting a comprehensive approach focused on the thematic clusters identified by this study is fundamental for improving quality of life and independence among older adults. Healthcare providers and decision-makers should heed these findings, which have the potential to contribute significantly to the health and independence of older individuals.

Within this framework, this study is necessary to develop strategies and interventions that will facilitate healthier and more independent living for older adults. It provides researchers and practitioners in the field with the opportunity to focus on themes and issues of critical importance, thereby paving the way for evidence-based practices designed to improve patient outcomes and healthcare service delivery for the elderly population.

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Ethical approval: The present study was conducted in strict accordance with the principles outlined in the Declaration of Helsinki. Ethical approval for the study was obtained from the appropriate ethics committee, and all participants provided informed consent before participating in the study.

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