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Article

The Overlooked Intersection Between Mild Cognitive Impairment and Hematologic Malignancies: Insights from a Mixed-Method Study

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Abstract: Background/Objectives: The unmet needs of individuals with mild cognitive impairment (MCI) and hematologic malignancies are often overlooked, despite the increasing prevalence of both conditions among older adults. This dual challenge underscores the need for healthcare professionals to better address the complex needs of this vulnerable population. **Methods:** This study employed a comprehensive, mixed-methods approach, combining a systematic review of relevant literature and social listening to gather insights from patient association websites and blogs. Keywords such as “hematologic malignancies,” “blood cancer,” and “mild cognitive impairment” were used to identify pertinent studies, while social listening provided additional patient-centered perspectives. **Results:** The systematic review revealed a critical gap in care—specifically, the absence of a frailty assessment tool adapted to both hematologic malignancies and cognitive impairment. Insights from social listening highlighted the perspectives of caregivers, who reported feelings of isolation, uncertainty around diagnosis, and significant caregiver burden in managing both cognitive and physical health challenges. **Conclusions:** The findings underscore the urgent need for comprehensive care frameworks that integrate cognitive assessments, improve communication between healthcare providers, and offer targeted support for caregivers. Future research should focus on the intersection of MCI and hematologic malignancies, aiming to develop validated tools and resources that support both patients and caregivers, ultimately improving clinical outcomes and fostering more patient-centered care for this underserved group.

Keywords: Mild Cognitive Impairment (MCI); Hematologic Malignancies; Patient-Centered Care; needs

1. Introduction

The impact of advancing age on the prognosis, treatment tolerability, efficacy, and quality of life in patients with hematologic malignancies is an area of growing scientific interest. As global population demographics shift—with the median onset of most hematologic malignancies occurring in the seventh decade of life—the number of older patients requiring specialized care is expected to increase substantially [1,2].

1.1. Demographic Shifts and Aging Population

By 2030, one in six individuals globally will be aged 60 years or older, with the population in this age group expanding from 1 billion in 2020 to 1.4 billion. By 2050, the population aged 60 and over is projected to double to 2.1 billion, and the number of individuals aged 80 and above will triple, reaching 426 million [1].

1.2. *Advancements in Hematologic Oncology for Older Adults*

In recent years, the treatment landscape for hematologic neoplasms—including leukemia, lymphoma, and myeloma—has transformed, largely due to advances in biologically targeted therapies and improvements in radiotherapy techniques. These developments have opened new treatment opportunities for older adults, including those previously deemed unfit for aggressive treatment [3,4]. However, in elderly patients, particularly those with mild cognitive impairment (MCI), the complexities of care become more pronounced.

1.3. *Cognitive Impairment in Older Cancer Patients*

Mild cognitive impairment (MCI) presents additional challenges that can lead to significant unmet needs, adversely affecting quality of life, treatment adherence, and overall well-being [5]. Similarly, individuals diagnosed with hematologic malignancies face considerable unmet psychological, physical, informational, financial, and spiritual needs [6].

It is increasingly recognized that older adults with hematologic malignancies require a specialized and tailored approach to their care. Interdisciplinary and multidisciplinary collaboration, particularly between hematologists and geriatricians, is essential for optimizing patient outcomes and effectively addressing the unique needs of this population [7]. Hamaker et al. showed that one-third of older patients with cancer starting treatment in a usual care pathway without specific oncogeriatric involvement despite geriatric assessment and management has been recommended in all old people before starting a treatment plan. Furthermore, these patients often lack information about their diagnosis and how to care for themselves at home. This adds stress for caregivers and can make it harder for patients to follow their treatment plans [8,9].

Despite this recognition, there remains a scarcity of research and tools designed to effectively address the care of older adults with MCI in oncology. Patients with MCI, by definition, exhibit cognitive impairment without significant interference in activities of daily living, making their needs more difficult to assess with standard tools. Furthermore, evidence shows that patients with MCI are less likely to receive effective procedures and this disparity is attributable to the physicians misconception and assumption that MCI inevitably leads to dementia [10]. In the other side, also MCI is a marker of frailty [11]. Traditional screening tools in oncology primarily focus on physical performance to define the treatment's fitness, often overlooking cognitive deficits especially mild forms or behavioral variants of cognitive decline [12]. Therefore, early stage of cognitive decline is a critically underexplored aspect of haematological oncology care.

This article aims to preliminarily explore the unmet needs of this specific vulnerable population by addressing the following research question: "What are the unmet needs and challenges faced by older adults with MCI and hematologic malignancies, particularly concerning quality of life and healthcare interactions?"

We hypothesized that these patients encounter unique and largely unaddressed challenges when interacting with the healthcare system. These challenges are often compounded by advanced age, cancer-related concerns, and cognitive impairment. Moreover, the impact of multimorbidity in this context is frequently greater than the cumulative effects of each individual condition, indicating a need for more tailored and holistic care approaches [13].

2. **Materials and Methods**

To identify the unmet needs of individuals with MCI and hematologic malignancies, we employed a comprehensive, mixed-methods approach that incorporated both systematic and qualitative data sources. Our first step involved a systematic search of the MEDLINE, PubMed, and CINAHL databases, focusing on studies from the past five years that addressed the needs of individuals with hematologic malignancies. We used specific keywords such as "hematologic malignancies," "hematologic neoplasms," "blood cancer," and "mild cognitive impairment" to capture a broad range of relevant literature. The search strategy included terms like "cognitive dysfunction" and "cognitive impairment" to target studies examining the cognitive dimension of

patient needs in this subgroup. Selected **criteria**: Individuals aged 65 years and older; English language, having both the clinical conditions.

We expanded our methodology by incorporating a social listening strategy to capture insights from a patient-centered perspective. This approach involved collecting data from blogs and patient association websites, where patients and caregivers commonly share their experiences and challenges related to their conditions. Appendix A provides the list of the web sources used for this research.

Our selection criteria for social media sources included the following:

- **Temporal Criteria (last 1 year)**: We focused on recent posts to capture the latest treatment experiences and social dynamics relevant to patients and caregivers. We chose a short period to ensure that insights reflect the most current developments, particularly as treatments, healthcare policies, and patient resources are continually evolving in these fields.
- **Specialized Patient Advocacy and Support Groups**: We included content from specialized cognitive and hematology-related support groups and advocacy organizations, as these groups often provide richer details and deeper engagement on specific conditions, as members feel more comfortable sharing openly with others facing similar issues.
- **Data Saturation and Thematic Coverage**: We continued sampling until data saturation was achieved, ensuring comprehensive thematic coverage.

Following data collection, we conducted a thematic analysis to categorize and label recurring themes. Frequency of Occurrence, Intensity and Emotional Tone (by using sentiment analysis tools, with particular attention to highly intense themes) and the Relevance to Research Questions was the criteria adopted for theme identification. We analyzed themes in the data using established methods, identifying patterns based both on existing knowledge and new observations from the data [14].

This research was conducted in accordance with ethical principles, including privacy, transparency, data integrity, and anonymity. We fully complied with the General Data Protection Regulation (GDPR 2016/679) and adhered to the relevant policies of each website platform used. Due to the preliminary nature of this study and privacy considerations, direct access to the raw data from social listening cannot be provided at this time. However, Appendix A lists the specific websites and patient forums where data were gathered.

3. Results

The data supporting this study's findings consist of two main components: (1) data from systematic review databases and (2) data collected from social listening sources. Despite the limited understanding in this field, we gained significant insights and identified several key themes that illustrate the unique challenges faced by this population when interacting with the healthcare system. Given the limited cross-validation between social and systematic findings, we have maintained a distinction between the results to ensure clarity and accuracy in our analysis.

3.1. Systematic Review Findings

Our systematic search yielded 31 articles published in the last five years that broadly addressed the needs of individuals with hematologic malignancies. However, none focused specifically on the aims of our study. In contrast, there is a substantial body of literature that separately explores issues related to hematologic cancer in older patients and cognitive impairment in cancer patients, which diverges from the original purpose of our article. However, we highlighted the unmet needs of healthcare professionals in this field, which indirectly impact patient care. Specifically, there is a pressing need for a frailty assessment score that is adapted for all hematologic malignancies, including an evaluation of MCI. This gap represents an unmet need for geriatricians and hematologists, with serious implications for the quality of care provided to this particularly vulnerable population.

3.2. Social Listening Insights

The social listening strategy yielded limited qualitative data from patient association blogs, and websites consulted. Notably, we observed a discrepancy in the age of contributors, with a significant representation from younger voices. However, the insights derived from this analysis, which primarily reflect the perspectives of caregivers rather than patients themselves, include the following:

1. **Feelings of Isolation:** Both patients and caregivers expressed feelings of isolation, as friends and family often misunderstood the cognitive symptoms. This lack of social understanding, combined with uncertainty surrounding diagnosis and prognosis—such as whether symptoms are due to chemotherapy toxicity, age-related cognitive decline, or early-stage cognitive impairment—contributed to an increased sense of loneliness among patients.
2. **Caregiver Burden:** Caregivers reported significant challenges in managing the needs of patients with both hematologic malignancies and MCI. The increased cognitive demands placed on caregivers highlight the urgent need for support programs that address caregiver stress and offer resources for managing cognitive symptoms in patients who also face physical challenges due to hematological malignancies, such as infections and fatigue.

4. Discussion

This article sheds light on the unmet needs of a particularly vulnerable population: older adults with MCI and hematologic malignancies. Given the latest estimations and predictions, this demographic is poised to have an increasingly significant impact on our healthcare system in the near future. Patient-centeredness and patient-centered care often presuppose that all patients possess the competence and ability to engage in important decisions regarding their own care. However, the frameworks designed for participation frequently emphasize efficiency, which can inadvertently marginalize patient groups with reduced physical and cognitive abilities [13]. As a result, these individuals may have limited opportunities to contribute to their own care decisions, highlighting the need for more inclusive approaches that accommodate diverse MCI patients' needs.

Unmet needs. By employing a mixed-methods approach that combines systematic reviews and qualitative insights, we have identified likely key challenges faced by these individuals within the healthcare system. The findings underscore the necessity for a comprehensive framework that addresses the complexities of managing hematologic cancers in older adults who also starting to experience cognitive decline. The coexistence of hematologic malignancies and MCI represents more than just a case of comorbidity; it signifies a complex interplay of challenges that require distinct attention and understanding. This combination creates unique needs and experiences that cannot be adequately addressed by simply viewing them as two separate conditions. Instead, this intersection calls for a holistic approach that considers the multifaceted implications for patient care and support. Our systematic review revealed a dearth of literature that specifically examines the intersection of MCI and hematologic malignancies, suggesting a significant gap in the current understanding and management of these patients. While existing studies address various aspects of hematologic cancers and cognitive impairment separately, few have explored their combined impact. This oversight has critical implications for clinical practice, as the unique needs of this population are often overlooked. The need for a frailty assessment tool that incorporates cognitive evaluation is particularly pressing. Such a tool would not only aid geriatricians and hematologists in tailoring care but also enhance the overall quality of life for patients who are navigating the complexities of both cognitive and oncological challenges.

Implication for caregivers. The social listening component of our research provided valuable insights, albeit primarily from caregivers rather than patients themselves. This perspective highlights the vital role caregivers play in the healthcare experience of older individuals with MCI and hematologic malignancies. Understanding the caregiver's perspective is crucial, as they often serve as the primary advocates and support systems for patients. The reported feelings of isolation experienced by caregivers emphasize a critical area for intervention. As friends and family members may misunderstand cognitive symptoms associated with "chemo brain" and MCI, there is a clear

need for educational initiatives aimed at enhancing awareness and understanding of these conditions within the broader social network of patients.

Additionally, the significant caregiver burden points to an urgent need for targeted support programs. Caregivers often experience high level of stress as they navigate the complexities of managing both hematologic malignancies and cognitive impairments in their loved ones. The caregiver burden associated with cognitive decline has been extensively studied [15]; however, when hematologic malignancies intersect with cognitive issues, the situation extends beyond mere comorbidity. We propose that this intersection gives rise to a new, convergent phenomenon of needs that merits further exploration.

Recommendation for future research. Understanding these unique challenges is crucial for developing tailored support strategies for both patients and their caregivers. Implementing support structures, such as respite care and caregiver education programs, could alleviate some of this burden and improve the overall caregiving experience. The World Health Organization (WHO) has emphasized that healthcare systems must evolve to better meet the needs of older adults. WHO defines healthcare quality as care that is effective, efficient, integrated, patient-centered, equitable, and safe [16]. The acceptability of healthcare quality is ultimately determined by the system's ability to address the needs of users while adapting to patients' expectations and perceptions. This shift in focus requires a more responsive approach to clinical care for older populations. It is essential to explore the specific needs of vulnerable subgroups, as aging is a highly individualized phenomenon. Understanding these diverse needs will enable healthcare systems to provide tailored, effective care that addresses the unique challenges faced by different segments of the older adult population.

Finally, the discrepancy in the age of patient contributors may be attributed to the digital divide and stigma, which can deter older patients from engaging in online discussions about their experiences [17]. Addressing these challenges requires the active involvement of all stakeholders and specific projects to both mitigate stigma and enhance digital literacy among older adults. Collaborative efforts can create a more supportive environment that encourages engagement and fosters open dialogue about their health experiences.

Cognitive impairment plays a crucial role in treatment adherence among patients with hematologic malignancies. The negative impact of MCI on the ability to understand and comply with complex treatment regimens is well-documented [18]. In the hematologic field, challenges are also compounded by the intricate nature of oncological therapies, which often require careful management of side effects and frequent adjustments based on patient response. Given that many older adults have varying degrees of cognitive decline, interventions aimed at enhancing treatment adherence must include cognitive assessments and tailored educational materials given the importance of cognitive health in managing especially chronic diseases.

The decline in quality of life for elderly patients with Hematologic Malignancies and MCI is predictable but further studies are necessary. Old patients report experiencing increased levels of anxiety, depression, and social isolation, which can significantly affect their overall well-being [19]. Current healthcare systems often fall short in providing comprehensive psychosocial support, resulting in unmet emotional and psychological needs. There is a growing recognition of the importance of integrated care models that combine medical treatment with mental health support to improve outcomes and enhance the overall quality of life [20].

Furthermore, effective communication is paramount in ensuring that patients fully understand their treatment options and the potential implications of their cognitive impairments. However, research indicates that communication barriers often exist between healthcare providers and patients, and are exacerbated by cognitive decline. The lack of structured approaches to incorporate cognitive evaluations into routine care hinders informed decision-making [21]. Implementing standardized geriatric assessments in hematologic settings could bridge this gap, enabling healthcare providers to offer more personalized care that considers the cognitive status of elderly patients. The inadequacy of current screening tools for cognitive impairment in oncology settings reinforce this need. Many existing tools focus primarily on physical performance status, neglecting the cognitive domain that can critically impact treatment outcomes. Implementing cognitive screening as a standard practice

could facilitate early identification of MCI, enabling timely interventions that can improve patient outcomes and adherence. Identifying the unique needs of patients with both MCI and hematologic malignancies is challenging due to the variable clinical presentations of both conditions. MCI symptoms may be subtle and fluctuate over time, complicating the attribution of specific needs solely to cognitive impairment versus cancer-related symptoms or treatment side effects. The current healthcare model frequently lacks the necessary interdisciplinary collaboration between hematologists, geriatricians, and neuropsychologists. This gap can lead to fragmented care and suboptimal outcomes for patients with MCI. Enhanced collaboration among healthcare professionals is essential to develop comprehensive care strategies that address both the oncological and cognitive needs of these patients. Interdisciplinary teams can foster communication and develop holistic care plans that consider the complex interplay between physical health and cognitive function.

This study addresses a critical gap by focusing on MCI in the context of hematologic malignancies, an area that remains significantly underexplored despite the demographic trend. However, this research aims not only to fill a knowledge gap but also to serve as a foundation for advancing care frameworks that holistically address both cognitive and hematologic needs, potentially improving the standard of care and quality of life for this growing and vulnerable population. There several positive benefit that could foster open collaboration and discussion from this first study (Table 1).

Table 1. Key Components for an Advanced Care Framework in Elderly Patients with MCI and Hematologic Malignancies.

Main pillar	Benefit
Enhanced Understanding of Cognitive Impact on Cancer Care	By specifically examining the intersection of MCI and hematologic malignancies, the framework can encourage more integrated cognitive assessments within oncology settings, helping to ensure that MCI-related needs are recognized and addressed early in the treatment process.
Contributing to Policy and Screening Recommendations:	By identifying the unique vulnerabilities of patients with MCI in oncology settings, the framework could contribute to updated screening guidelines and policies that emphasize cognitive as well as physical assessment for older adults with hematologic malignancies. This could drive future research and policy development aimed at integrating cognitive health as a critical factor in cancer care for aging populations.
Developing Patient-Centered Interventions:	The framework on unmet needs offers of this population could offer an opportunity to recommend new patient-centered interventions, such as tailored communication strategies or cognitive-supportive tools, that can improve patient interactions with the healthcare system. These tools can be instrumental in improving patient comprehension, adherence, and engagement, which are essential for older adults facing both cognitive and hematologic health challenges.
Informing Tailored Multidisciplinary Care Approaches.	The complexity to manage some emerging conditions in the elderly claims for the interdisciplinary collaboration, particularly between oncologists and cognitive specialists, to develop care pathways that accommodate both hematologic and cognitive health concerns. The framework could includes how to design support systems for patients who may struggle with complex treatment regimens due to cognitive limitations, thereby fostering better outcomes in both fields

To the best of our knowledge, this is the first study to address this topic. The application of social listening represents an innovative approach in this context, offering insights that extend beyond traditional clinical observations. Given the novelty of this topic and the increasing relevance of digital tools in a rapidly changing society, we aimed to introduce this method as an initial exploration.

Moving forward, further studies are planned to refine this methodology and to conduct a comprehensive real-life qualitative study within our clinical setting. This next phase will allow us to deepen our understanding and validate findings from social listening in a controlled, patient-centered environment, ultimately enhancing the relevance and applicability of our insights to clinical practice.

Our study presents several limitations worthy to be indicated: First, although we focused on recent studies from the past five years, our reliance on MEDLINE, PubMed, and CINAHL may have excluded relevant studies from other emerging databases, gray literature, or non-English publications. This may have limited our ability to capture the full breadth of research on patient needs, especially in non-clinical or psychosocial domains, and could reflect publication biases within indexed sources. Second, our keyword strategy, while broad, may not fully capture studies that used alternate terminology or were focused on intersecting but distinct topics, such as specific subtypes of hematologic malignancies or MCI without explicit reference to cognitive dysfunction. Consequently, relevant insights may have been missed due to keyword mismatches or terminology differences (i.e., moderate cognitive changes, or subjective cognitive complaints). Finally, regarding the social listening component, we may have overlooked other relevant social media sources. Not all patient association groups may have a website or be easily accessible, which could further contribute to the underrepresentation of individuals with cognitive decline or limited internet access. This gap introduces potential bias in our data. However, the decision to use only a few well-known websites was made to ensure the reliability and credibility of the data sources. These platforms are widely recognized for providing accurate, trustworthy, and relevant information, which is crucial for maintaining the integrity of the research. By limiting the scope to reputable sources, we aimed to minimize the risk of bias and misinformation that can arise from less established or unverified platforms. That said, from a research perspective, not acknowledging additional valuable sources could limit the generalizability of our findings and may fail to capture the full range of experiences within this population. As this is an initial exploratory study, the social listening data are not fully accessible for reproducibility due to privacy constraints and the evolving nature of digital content. This limitation highlights the need for ongoing methodological refinement and future studies designed for real-time data validation in clinical environments.

These limitations highlight the complexity of comprehensively assessing the needs of individuals with MCI and hematologic malignancies, emphasizing the need for continual methodological refinement to capture a more representative and nuanced understanding of this unique patient subgroup and the close cooperation between geriatricians and hematologists. While this initial investigation has provided a first look in this topic, it is important to recognize that further studies are essential to comprehensively understand this issue. Overall, our research highlights the critical importance of integrating patient and caregiver perspectives into geriatric oncology care. By addressing the unique challenges faced by older adults with MCI and hematologic malignancies, we can work toward more effective, patient-centered care. However, there is currently no comprehensive framework to adequately capture the needs of this increasingly represented group of patients. Future research should focus on exploring this intersection further, aiming to develop validated tools and resources that support both patients and caregivers in managing their complex healthcare needs, by employing longitudinal qualitative methodologies. Such an approach not only holds the promise of improving clinical outcomes but also fosters a more inclusive and high-quality healthcare environment for this vulnerable population.

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Data Availability Statement: The database used for the literature search and the Excerpt of spreadsheet tracking code changes for the qualitative analysis are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Access to the systematic review database is available upon request to the corresponding authors and after institutional permissions. For researchers interested in reproducing or expanding upon this study, we recommend further data collection and validation within controlled clinical settings as part of future qualitative research. Here is the keywords for our advanced research: ["hematologic malignancies"[All Fields] OR "hematologic neoplasms"[MeSH Terms] OR ("hematologic"[All Fields] AND "neoplasms"[All Fields]) OR "hematologic neoplasms"[All Fields] OR ("hematologic"[All Fields] AND "malignancies"[All Fields]) OR "hematologic malignancies"[All Fields] OR ("blood"[All Fields] AND "cancer"[All Fields]) OR "blood cancer"[All Fields] AND mild cognitive impairment: "cognitive dysfunction"[MeSH Terms] OR ("cognitive"[All Fields] AND "dysfunction"[All Fields]) OR "cognitive dysfunction"[All Fields] OR ("mild"[All Fields] AND "cognitive"[All Fields] AND "impairment"[All Fields]) OR "mild cognitive impairment"[All Fields].

The online resources we consulted for this research included:

1. Patient Association Websites: We reviewed official websites of well-established organizations that focus on hematologic cancers and cognitive impairment, such as the Leukemia & Lymphoma Society (LLS) (Leukemia & Lymphoma Society | Blood Cancer Leaders | LLS); the Multiple Myeloma Research Foundation (MMRF) (Multiple Myeloma Patient Stories | The MMRF),
2. Blogs and Online Support Forums: In our research we included online community platforms like and Blood-Cancer (Blood Cancer Health Info & Community (blood-cancer.com); CancerCare (Free professional support for anyone affected by cancer (cancercare.org), HealthUnlocked (HealthUnlocked | The social network for health), and Cancer and dementia (Macmillan Cancer Support | The UK's leading cancer care charity).

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