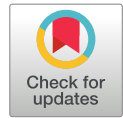


Symptom Management in Hematopoietic Stem Cell Transplantation: A Scoping Review Coupled with Bibliometric Analysis



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Abstract

Objective: Haematopoietic stem cell transplantation (HSCT) is a common treatment for various benign and genetic diseases, particularly haematologic malignancies. Despite its utility, the transplantation process and post-transplantation period significantly challenge symptom management and quality of life for patients.

Methods: This study presents a scoping review integrated with a bibliometric analysis based on 59 studies retrieved from the Web of Science (WoS) database, focusing on symptom management in patients with HSCT. The search was conducted between February 18 and 21, 2025, using the terms "bone marrow transplant" OR "haematopoietic stem cell transplantation" AND "symptom management," limited to peer-reviewed English articles. Of the identified studies, 15 were nursing-focused and included in the review. VOSviewer 1.6.20 was used to explore research trends and collaboration networks, while thematic analysis was conducted to categorise the findings.

Results: The research spans from 2005 to 2024, with peak publications in 2013. The predominant WoS categories were health services sciences, oncology, and nursing, with palliative care and cancer survivorship as the most cited topics. The United States contributed the most publications, particularly after 2020. Most studies involved adult patients, with a significant number being randomised controlled trials (RCTs) or descriptive studies. Interventions, such as telephone counselling training, virtual reality applications, and mobile app support for nutritional habits, demonstrated effectiveness in symptom management.

Conclusion: Patient-centred strategies, individualised nursing practices, and the integration of digital health technologies are crucial for effective symptom management in HSCT patients. Future research should not only evaluate the long-term effects of these approaches but also address specific gaps in the literature such as their impact on paediatric HSCT patients, caregivers, and diverse cultural populations.

Keywords

bibliometric analysis • haematopoietic stem cell transplantation • nursing, scoping review • symptom management



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INTRODUCTION

Haematopoietic stem cell transplantation (HSCT) is a treatment method used in the treatment of various benign and genetic diseases, especially haematologic malignancies, and has an important place in the fight against life-threatening diseases. This process begins with myeloablative or non-myeloablative preparative regimens to suppress the immune system of patients, followed by autologous or allogeneic stem cell infusion (1). The early post-transplant period is a critical time when patients are at risk of serious infections, organ toxicities, graft-versus-host disease (GVHD), and regimen-related complications. Although these complications may require prolonged hospitalisation, patients need intensive follow-up after discharge until their immune system is fully recovered. Various symptoms that significantly affect patients' quality of life characterise this physically and psychosocially challenging process (2,3).

The most common physical symptoms in HSCT patients include mucositis, nausea, vomiting, diarrhoea, anorexia, fatigue, pain, sleep disorders, and cardiovascular complications. Mucositis and gastrointestinal side effects due to high-dose chemotherapy or radiotherapy may adversely affect the nutritional and hydration status of patients and prolong hospitalisation. In addition, the risk of infection increases due to immunosuppression, which can lead to life-threatening complications such as sepsis (4,5). In addition, long-term isolation brings psychosocial problems such as loss of physical independence, uncertainty, fear of relapse, anxiety, and depression. During the HSCT process, patients' perceptions of identity, changes in social roles, economic concerns and future concerns are among the important factors that make their psychological adaptation difficult. Failure to manage these symptoms effectively may negatively affect patients' adherence to treatment and overall health outcomes (6,7).

Nurses are one of the main actors of symptom management in the HSCT process and take various interventions to alleviate both the physical and psychosocial symptoms of patients. Symptom management requires nurses to create individualised care plans and develop an early detection and preventive strategies (8). For example, implementing oral care protocols to prevent the development of mucositis, promoting exercise programmes to reduce fatigue, providing psychosocial support and organising patient education are among the main roles of nurses in patient care. In addition, in line with technological developments, innovative approaches such as the integration of digital health applications such as virtual reality (VR) and augmented reality (AR), telehealth

services, and mobile application-supported patient follow-up are increasingly included in nursing care. In this context, symptom management in HSCT patients should be addressed holistically with supportive care approaches and not only with pharmacologic treatments (9,10,11).

Although research in this field evaluates the effectiveness of different interventions in symptom management in HSCT patients, studies that provide a holistic perspective on the general scope of studies in the field of nursing, research trends and dynamics in knowledge production are limited (8). This review aims to identify the trends in the research field, the most frequently studied topics, and the most cited studies by examining the literature on symptom management in the HSCT process through bibliometric analysis. At the same time, a scoping review will be conducted to evaluate the scope and impact of the studies in the field of nursing, and the symptom management strategies applied by nurses for HSCT patients and the knowledge in this field will be examined in detail. This study aims to contribute to the development of evidence-based approaches in nursing practice, to evaluate the applicability of effective strategies in patient care and to guide future research.

METHODS

This study was conducted in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines and the Joanna Briggs Institute (JBI) Scoping Review Methodology. A two-step approach was adopted: first, a bibliometric analysis was performed to map the existing literature on symptom management in HSCT; then, a scoping review was conducted using the studies identified through the bibliometric analysis. As the aim of a scoping review is to map the available evidence rather than to critically appraise individual studies, a quality assessment was not performed (12,13).

Step 1: Bibliometric Analysis

Using VOSviewer 1.6.20, a bibliometric analysis was performed to investigate research trends, collaboration networks, and patterns of keyword co-occurrence within the selected studies. The primary aim of this analysis was to:

- Identify leading authors, institutions, and countries contributing to symptom management research in HSCT
- Analyse keyword trends to understand the research focus areas
- Map scientific collaboration networks



To visualise the relationships between studies and emerging themes in symptom management, co-authorship networks and keyword co-occurrence maps were created.

Step 2: Scoping Review

Stage 1: Identifying the Research Question

This scoping review aimed to map the existing literature on symptom management in HSCT patients, identifying key intervention strategies, research gaps, and implications for clinical nursing practice. The study was structured using the PICOS (Population, Intervention, Comparison, Outcome, Study Design) framework to address specific research questions. Research questions:

- What are the key characteristics (e.g., publication year, country, study design) of studies on symptom management in HSCT?
- What symptom management interventions have been reported in the literature?
- What are the research gaps and future directions in this field?

Stage 2: Identifying the Databases and Relevant Studies

A comprehensive search was conducted in the Web of Science (WoS) database from February 18 to 21 February 2025. The search used the keywords "bone marrow transplant" OR "haematopoietic stem cell transplantation" AND "symptom management," considering only peer-reviewed articles published in English.

Stage 3: Study Selection

Studies were included based on the following criteria:

- Articles addressing symptom management in HSCT patients
- Studies published in English
- Research focused on nursing interventions and categorised within the nursing field

Of the 59 studies, only 15 were classified as nursing research and were included in the final scoping review analysis.

Stage 4: Data Extraction and Analysis

A standardised data extraction form was developed in Microsoft Excel. The extracted data included:

- Study characteristics (authors, publication year, country, journal)

- Study type (e.g., randomised controlled trials, observational studies, qualitative research)
- Symptom management interventions and outcomes
- Thematic findings related to clinical nursing practice

A thematic analysis was performed to categorise symptom management strategies, pinpoint frequently used interventions, and underscore existing gaps in research.

Stage 5: Collating, Summarising, and Reporting the Results

Descriptive statistics, including frequency and percentage, summarised key study characteristics. The findings from the thematic analysis were organised into major intervention strategies, research trends, and clinical implications for nursing practice. Non-nursing studies were excluded because the primary aim of this review was to specifically explore the role and impact of nurses in the symptom management of HSCT patients.

Ethical Considerations

This study was conducted in accordance with the ethical guidelines. As this is a scoping review based on publicly available data, formal ethics committee approval was not required. However, the review adhered to the ethical principles outlined in the Declaration of Helsinki and followed the best practices for conducting systematic literature reviews.

RESULTS

This study comprehensively examined the literature on symptom management in HSCT using bibliometric analysis. The results show increased scientific production over time, highlighting symptom management as a multidimensional field encompassing clinical, psycho-social, palliative, and supportive care aspects. Key themes include palliative care, life after cancer, and GvHD.

When the distribution of publications on symptom management in haematopoietic stem cell transplantation is analysed by year, there is a general increase over time despite some irregularities (Figure 1). From 2005 to 2011, the number of publications remained low (1–2 per year), indicating limited interest. However, 2013 marked a significant rise with 7 publications (11.9%), and this trend continued steadily into the 2020s. In 2022 and 2023, the number of studies increased again (n=6 each), confirming the growing interest in this field. Although the number for 2025 appears low (n=2), this may be due to incomplete data. Overall, these results show that interest in symptom management in HSCT is increasing but still lacks consistency in the research volume.



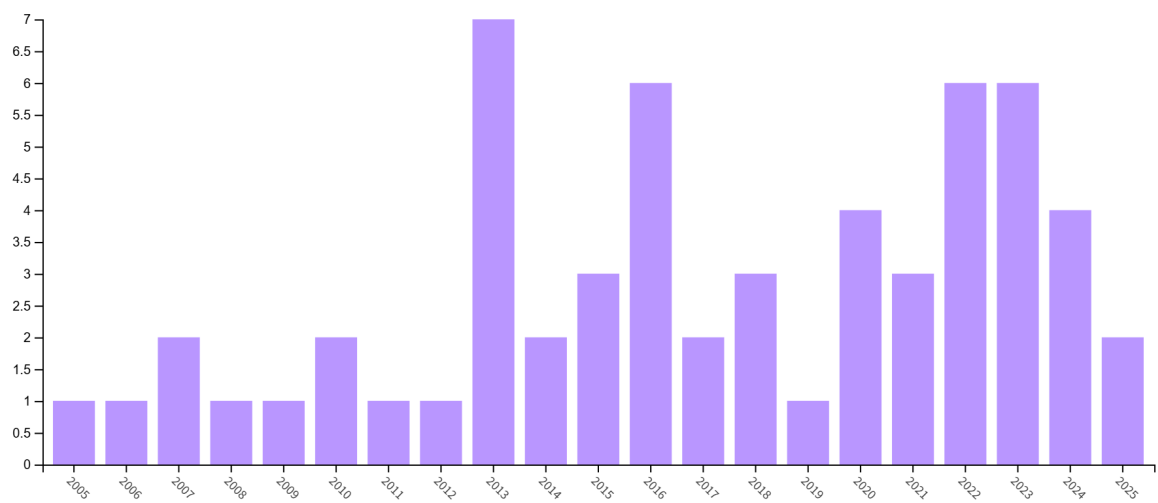


Figure 1. Distribution of publications by years

According to Table 1, most studies were original research articles (n=44, 74.6%), followed by meeting abstracts (n=8, 13.6%), review articles (n=5, 8.5%), and letters (3.4%). This indicates that the field is mainly built on empirical data, with some contributions reflecting ongoing developments and discussions.

Table 1. Document Types

Document Types	Record Count	% of 59
Article	44	74.576%
Letter	2	3.390%
Meeting Abstract	8	13.559%
Review Article	5	8.475%

In terms of geographic distribution, the United States of America leads significantly (n=38, 64.4%), followed by Canada and China (n=4 each), and France, Russia, and Turkey (n=3 each) (Table 2). While these numbers show global interest, they also reveal a strong concentration in a few countries. This points to the need for broader international research contributions.

Table 2. Countires

Countries/Regions	Record Count	% of 59
Canada	4	6.780%
France	3	5.085%
Russia	3	5.085%
United States of America	38	64.407%
China	4	6.780%
Türkiye	3	5.085%

The Web of Science category analysis shows that publications mostly fall under Health Care Sciences & Services (42.4%), followed by Oncology (35.6%), Internal

Medicine and Clinical Neurology (27.1%), Nursing (25.6%), and Transplantation (17%) (Table 3). This distribution reflects the interdisciplinary nature of the topic and confirms that symptom management is not solely a nursing issue but a shared concern among various clinical fields.

Table 3. Web of Science Categories

Web of Science Categories	Record Count	% of 59*
Oncology	21	35.593%
Medicine General Internal	18	27.119%
Health Care Sciences Services	25	42.373%
Clinical Neurology	16	27.119%
Nursing	15	25.644%
Transplantation	10	16.949%

*Included in more than one Web of Science Category.

In terms of indexing, most studies are listed in SCI-EXPANDED (89.8%), with additional representation in SSCI (35.6%), ESCI (10.2%), and CPCI-S (10.2%) (Table 4). These findings show that the topic is not only addressed within the scope of medical and health sciences but also within a social scientific framework and has gained visibility in different indexes.

Table 4. Web of Science Index

Web of Science Index	Record Count	% of 59*
Emerging Sources Citation Index (ESCI)	6	10.169%
Conference Proceedings Citation Index–Science (CPCI-S)	6	10.169%
Science Citation Index Expanded (SCI-EXPANDED)	53	89.831%
Social Sciences Citation Index (SSCI)	21	35.593%

* It is indexed in more than one Web of Science Index.



The keyword analysis revealed that commonly used terms included “palliative care,” “symptom management,” and “life after cancer,” emphasising patient-centred and long-term care approaches (Figure 2). The variety of keywords demonstrates an integration of the physical, psychosocial, and technological dimensions. Terms like GVHD, virtual reality, acupuncture, and biomarkers show that research spans both clinical treatments and supportive care strategies. These findings highlight the need for a holistic and interdisciplinary approach to symptom

management that combines physiological and psychological perspectives.

The author analysis indicates that a limited number of researchers have contributed multiple publications, with Fall-Dickson JM leading (4 publications, 6.8%). Several others, such as Cohen MZ and Hacker ED, contributed three papers each (Figure 3). While this shows the emerging expertise in the field, it also highlights a need for more widespread academic engagement.

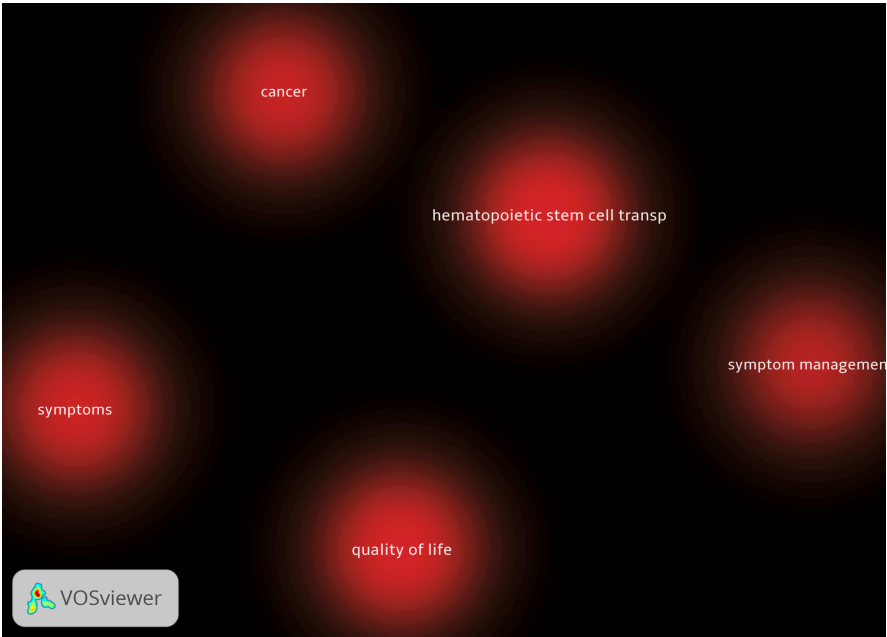


Figure 2. Keywords



Figure 3. Authors

In the scoping review part of this study, various nursing interventions for HSCT patients, symptom management strategies and their contributions to patient care were examined. The findings reveal the importance of individualised, multidisciplinary and evidence-based approaches in the care processes of HSCT patients.

When interventions for patient education and empowerment programmes were examined, it was determined that the health empowerment programme developed by Kwak et al. (2023) significantly improved health literacy, self-management skills and symptom control by increasing patients' active participation in health-related decision-making processes (14). Similarly, in a randomised controlled trial conducted by Menekli and Yaprak (2021), it was shown that the training programme based on Bandura's Social Cognitive Learning Theory and telephone counselling support significantly reduced care dependency by reducing symptom severity in HSCT patients. These findings indicate that the integration of education-based interventions into patient care processes contributes positively to patients' symptom management and compliance with the treatment process (15).

When the studies on symptom management are examined, qualitative studies conducted by Chen et al. (2022) and White et al. (2020) revealed the experiences of patients in the HSCT process regarding symptom management and emphasised the need for nurses to provide individualised trainings by continuous symptom assessment (16,17). Descriptive studies conducted by Çalışkan and Can (2022) and Oğuz et al. (2014) determined that the most common symptoms encountered in the early post-discharge period were pain, fatigue, loss of appetite, insomnia and anxiety and revealed the necessity of individualised nursing approaches for the management of these symptoms (18,19). Chen et al. (2023) found that HSCT patients who experienced taste changes developed different coping strategies to manage symptoms, and in this context, they drew attention to the importance of individualised nursing interventions (20).

Studies examining the effectiveness of technology-based interventions have shown that virtual reality and mobile health applications contribute to patient care. In a quality improvement initiative conducted by Vega et al. (2022), virtual reality (VR) applications were offered to patients twice a week and significant improvements were found in symptoms such as depression, anxiety, fatigue, pain, and anorexia (21). Rodgers et al. (2013) showed that mobile health applications helped young HSCT patients manage nutrition-related symptoms and enabled the effective use of technology in patient education processes (22).

Studies examining the effects of psychosocial support interventions show that interventions to improve the psychological well-being of patients and their families play a critical role in patient care. Montgomery et al. (2024) found that the psychological distress experienced by parents during the treatment process of paediatric patients is directly related to the children's symptom burden and health-related quality of life, emphasising that psychoeducational support for parents can positively affect patient outcomes (23). Lynch Kelly et al. (2015) stated that more effective symptom management can be achieved by targeting specific biomarkers in dealing with symptoms that negatively affect the quality of life of patients with chronic GVHD (24).

Studies examining the effect of exercise and physical activity on symptom management and quality of life have shown that physical activity plays an important role in reducing fatigue and improving physical functioning in HSCT patients. Chiffelle et al. (2013) reported that nurses should develop interventions that encourage physical activity by determining that exercise programmes implemented during the HSCT process reduce fatigue and improve physical functions in patients (25). Hacker et al. (2006) found that patients showed a significant increase in fatigue and a decrease in physical activity level in the post-HSCT period and emphasised that nurses should develop interventions to increase the functional independence of patients by providing supportive care in this period (26). Detailed information about all the studies is given in Table 5.

DISCUSSION

This study aimed to reveal the dynamics of scientific production, trends in nursing practices, and research gaps in this field from a multidimensional perspective by evaluating the literature on symptom management in the HSCT process using both bibliometric analysis and the scoping review method. The findings show that symptom management is not only a medical necessity but also a critical area of care that affects the individual's quality of life, psychosocial adjustment, and participation in the treatment process.

The results of the bibliometric analysis revealed that publications on symptom management in the context of HSCT have increased over the years, especially in 2013 and 2023. This increase indicates a deepening interest in HSCT in related health sciences, particularly in the discipline of nursing. However, it is observed that literature production is concentrated in certain countries (especially the USA) and research outputs are not homogeneously distributed on a global scale.

Table 5. Features of the studies

Author, Year, and Country	Sample Size	Research Type	Intervention	Contribution to Nursing Practice
Kwak et al.,2023, South Korea	43 patients undergoing haematopoietic stem cell transplantation	Experimental study	A healthcare empowerment programme was developed and implemented to enhance patients' ability to make informed health-related decisions and actively participate in their care process.	The results demonstrated that the programme significantly improved patients' health competence, self-management skills, and symptom management. These findings emphasise the importance of patient-centred and empowering approaches in the nursing care of HSCT patients.
Menekli and Yaprak,2021, Türkiye	A total of 106 patients undergoing haematopoietic stem cell transplantation were randomly assigned to either the intervention group (n=53) or the control group (n=53)	Randomised controlled trial	The intervention group received educational sessions based on Bandura's Social Cognitive Learning Theory, supplemented with telephone counselling. Data collection tools included a sociodemographic data form, the Edmonton Symptom Assessment Scale, and the Care Dependency Scale. Assessments were conducted 1 day post-transplantation and again 12 weeks later.	The study demonstrated that educational interventions, combined with telephone counselling grounded in Bandura's theory, effectively reduced symptom severity and care dependency in HSCT patients. These findings indicate that integrating such educational programmes into nursing practice can enhance patient outcomes by promoting self-efficacy and better symptom management post-transplantation
Chen et al., 2022, Çin	The study included 19 adult patients undergoing haematopoietic stem cell transplantation	Qualitative descriptive study with a longitudinal design	Semi-structured interviews were conducted at four time points during hospitalisation: upon admission, during the pre-transplant conditioning period, on the day of transplantation, and the day before discharge. A total of 64 interview datasets were collected to explore patients' symptom experiences and self-management strategies.	Continuously assess and monitor patients' symptoms throughout hospitalisation. Educate patients on recognising, articulating, and managing multiple symptoms effectively. Develop and implement interventions aimed at enhancing patients' self-management skills.
White et al., 2020, ABD	40 adult patients undergoing haematopoietic stem cell transplantation	Qualitative descriptive study	The study involved conducting interviews with patients before and 30 days after transplantation to explore their perceptions of self-efficacy in managing symptoms during the acute phase of HSCT.	Findings revealed themes such as confidence, responsibility, and holistic self-care (mind, body, and spirit). Patients reported high self-efficacy before transplantation, which diminished when symptom distress peaked. These insights underscore the need for nurses to assess self-efficacy levels pre-transplant and implement interventions that bolster patients' confidence and abilities to manage symptoms effectively during critical periods. Findings indicated that survivors of childhood haematologic malignancies, regardless of the treatment type, exhibited a higher prevalence of symptoms and



Author, Year, and Country	Sample Size	Research Type	Intervention	Contribution to Nursing Practice
Çalışkan and Can, 2022, Türkiye	The study included 200 patients who had undergone haematopoietic stem cell transplantation	Descriptive study	Data were collected using a patient information and interview form developed by the researchers, the Memorial Symptom Assessment Scale (MSAS), and the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30). Assessments focused on symptoms experienced at home during the early post-discharge period, coping behaviours employed by the patients, and their quality of life.	<p>impaired HRQoL compared with non-cancer controls. The occurrence of chronic health conditions, rather than the treatment modality itself, was a significant predictor of these outcomes. This underscores the need for regular symptom screening and management in survivorship care to improve patient outcomes.</p> <p>The study identified that the most frequently experienced symptoms among patients after discharge were pain (63%), weakness (48%), and loss of appetite (43%). While many patients adhered to cope behaviours recommended in the literature, these strategies were only partially effective. The findings highlight the importance of nurses providing comprehensive discharge education and support, emphasising effective symptom management strategies. Tailored interventions are necessary to address individual patient needs, enhance coping efficacy, and improve the overall quality of life during the critical post-transplantation period.</p>
Oğuz et al., 2014, Türkiye	The study included 132 patients who had undergone haematopoietic stem cell transplantation	Descriptive study	Data were collected using patient interviews and standardised assessment tools to evaluate the frequency, severity, and distress of symptoms experienced at home during the early post-discharge period.	<p>The study identified that the most frequently reported symptoms among patients after discharge were difficulty sleeping, problems with sexual interest or activity, shortness of breath, feeling nervous, feeling drowsy, and worrying. The other common symptoms included diarrhoea, lack of energy, feeling sad, cough, and itching. The most severe and distressing symptoms reported were problems with sexual interest or activity, difficulty sleeping, diarrhoea, hair loss, and problems with urination. These findings highlight the importance of nurses providing comprehensive discharge education and support, emphasising effective symptom management strategies. Tailored interventions are necessary to address individual patient needs, enhance coping</p>



Author, Year, and Country	Sample Size	Research Type	Intervention	Contribution to Nursing Practice
Vega et al., 2022, ABD	20 participants aged 19–70 years (median age of 56.5 years) undergoing allogeneic haematopoietic stem cell transplantation	Quality improvement initiative	Participants received up to two virtual reality (VR) sessions per week for two weeks during their hospitalisation. Each session involved engaging with VR applications related to relaxation, such as meditation, art, and nature experiences. Symptom distress was assessed using the revised Edmonton Symptom Assessment Scale (ESAS-r) before and after each session	<p>efficacy, and improve the overall quality of life during the critical post-transplantation period.</p> <p>The VR sessions led to significant improvements in 8 of the 10 symptoms measured by the ESAS-r, including depression, anxiety, tiredness, drowsiness, appetite, pain, quality of life, and well-being. These findings indicate that VR can serve as a low-cost, non-pharmacological intervention to alleviate symptom distress in HSCT patients. Implementing VR in nursing practice may enhance patient comfort and support during prolonged hospitalisations associated with HSCT</p> <p>The study found that QoL had a significant negative correlation with symptom distress and significant positive correlations with effective symptom management strategies and self-management behaviours. These factors explained 39.4% of the variance in QoL. The findings underscore the importance of efficient symptom management and tailored nursing interventions that focus on patient-centred approaches to enhance QoL in HSCT patients.</p>
Jo et al., 2022, Güney Kore	The study involved 67 patients undergoing haematopoietic stem cell transplantation	Descriptive correlational study	Data were collected using self-reported structured questionnaires to assess: Symptom experience Symptom management strategies Self-management behaviour Quality of life (QoL)	<p>The study found that parents experienced significant psychological distress throughout their child's treatment, which was associated with the child's symptom burden and HRQoL. These findings highlight the importance of providing psychoeducational support to parents, as alleviating parental distress may positively impact the child's symptom experience and quality of life.</p>
Montgomery et al., 2024, ABD	140 child-parent dyads (280 participants)	Longitudinal, repeated-measures study.	Parents completed self-report measures of psychological distress at four time points: before cell infusion and days +30, +60, and +90 after infusion. Children's symptom burden and health-related quality of life (HRQoL) were assessed at corresponding intervals.	<p>The study found that the exercise programme significantly reduced fatigue levels and improved physical functioning in HSCT recipients. These findings indicate that incorporating structured exercise interventions into</p>
Chiffelle et al., 2013, ABD	100 patients undergoing haematopoietic stem cell transplantation	Randomised controlled trial	Participants were randomly assigned to either an exercise group or a control group. The exercise group engaged in a supervised physical exercise programme, which included aerobic and resistance training, initiated during the inpatient	



Author, Year, and Country	Sample Size	Research Type	Intervention	Contribution to Nursing Practice
Chen et al., 2023, Çin	Thirty one patients undergoing haematopoietic stem cell transplantation (HSCT)	Descriptive qualitative study	<p>phase and continued for six weeks post-transplantation. The control group received standard care without a structured exercise regimen.</p> <p>Face-to-face semi-structured individual interviews were conducted to explore the patients' experiences and consequences of taste alterations during HSCT. The data were analysed using Colaizzi's seven-step method, guided by the Symptom Management Theory.</p>	<p>patient care plans can effectively manage fatigue, a common and debilitating symptom in this patient population. Nurses play a crucial role in facilitating and promoting such exercise programmes, thereby enhancing patient outcomes and quality of life.</p> <p>Complexity and Diversity of Taste Experiences: Patients reported varied and dynamic changes in taste during HSCT. Coping Strategies: Three distinct coping styles were observed: active coping, reluctant submission, and passive coping. Multifaceted Challenges of Coping: Factors influencing coping included treatment modalities, individual patient characteristics, and the healthcare environment. Develop individualised intervention plans to assist patients in effectively managing taste alterations.</p>
Rodgers et al., 2013, ABD	16 adolescent patients recovering from allogeneic haematopoietic stem cell transplantation	Repeated-measures design to evaluate the intervention	<p>The study assessed the Eating After Transplant (EAT!) programme, a mobile phone application designed to assist adolescents in self-managing common eating-related issues during HSCT recovery. Participants provided feedback on the application's acceptability and usability, rated it using a Likert scale, and their usage was monitored. Competency was evaluated through the orientation time and independent demonstration of application use</p>	<p>The findings indicated that the EAT! application was a feasible and acceptable method for educating adolescents on symptom management strategies post-HSCT. This indicates that mobile health interventions can effectively support adolescent patients in managing their recovery. Nurses can leverage such technology to provide accessible and age-appropriate self-care resources, potentially enhancing patient engagement and outcomes during the critical post-transplantation period.</p>
Kelly et al., 2015, ABD	24 adult patients diagnosed with chronic graft-versus-host disease	A prospective, cross-sectional cohort study	<p>This study aimed to describe the associations among symptoms, cytokines, and quality of life (QOL) in patients with cGVHD. Participants completed assessments measuring symptom prevalence and QOL and provided blood samples for cytokine analysis.</p>	<p>The findings indicated that patients with cGVHD experience multiple symptoms, including sexual dysfunction, which adversely affect their QOL. Understanding the interrelated symptoms and associated biomarkers may lead to targeted symptom management interventions. Nurses can utilise this knowledge to develop comprehensive care plans that address the complex symptom burden in cGVHD patients,</p>

Author, Year, and Country	Sample Size	Research Type	Intervention	Contribution to Nursing Practice
Fall Dickson et al., 2008, ABD	The study involved 30 women diagnosed with breast cancer undergoing autologous haematopoietic stem cell transplantation	Cross-sectional, correlational study	The study aimed to describe stomatitis-related pain in the participants. It tested the hypotheses that significant, positive relationships would exist between oral pain and factors such as stomatitis severity, state anxiety, depression, and alterations in swallowing. The researchers also hypothesised that stomatitis severity, the sensory dimension of oral pain, and state anxiety would most accurately predict the overall intensity of oral pain.	ultimately aiming to improve their QOL. The findings indicated significant positive associations between oral pain and stomatitis severity, as well as between oral pain and alterations in swallowing. Understanding these relationships can help nurses develop targeted interventions to manage stomatitis-related pain, thereby improving the quality of care for women undergoing autologous HSCT for breast cancer.

Some countries, including Turkey, have made limited contributions to the field, highlighting the need to diversify research in cultural contexts and increase context-based evidence (27,28).

The Web of Science category and index analyses revealed that symptom management in the HSCT process is not limited to the nursing discipline, but has become a common research theme in many clinical fields such as oncology, internal medicine, neurology, and palliative care. This finding emphasises the necessity of addressing this field with a multidisciplinary approach due to its nature and shows that nurses should assume a central coordination role in this collaborative environment (29,30).

Findings based on keyword analyses reflect the expanding thematic boundaries and increasing methodological diversity of the topic of symptom management. Concepts such as “palliative care”, “life after cancer”, “taste changes”, “GVHD”, “art therapy”, “virtual reality”, “biomarkers” and “mobile health applications” indicate the growing importance of holistic approaches that encompass the biopsychosocial dimensions of patient care. In particular, studies combining molecular research with clinical observations have revealed that symptom management is built on both physiological and experiential foundations (31).

The findings of the scoping review show that symptom management strategies specific to the nursing discipline are multifaceted and evidence-based. In particular, education-based interventions had positive effects on patient self-efficacy, symptom control, and the independence of care.

Studies conducted by Menekli and Yaprak (2021) and Kwak et al. (2023) revealed that nursing education supported by theoretical foundations such as Bandura’s Social Cognitive Theory significantly improved the participation of HSCT patients in the treatment process and their ability to cope with symptoms (14,15). These findings emphasise the importance of theoretically based interventions in nursing practice and support the effect of person-centred care approach in improving patient outcomes. Qualitative studies of symptom experiences (Chen et al., 2022; White et al., 2020) suggest that understanding patients’ subjective experiences is critical to the development of individualised care plans (16,17). Symptoms such as taste changes (Chen et al., 2023), sleep disorders (Oğuz et al., 2014), and psychological distress (Montgomery et al., 2024) are complex phenomena that need to be evaluated not only in physical dimensions but also in psychosocial and cultural dimensions (19,20,23). In this context, nurses need to perform symptom management based on holistic assessment principles, not only symptom-oriented. Technology-based interventions reveal the increasing importance of innovative approaches in nursing practice.

In particular, digital technologies such as virtual reality (Vega et al., 2022) and mobile health applications (Rodgers et al., 2013) are effective in the management of symptoms in the HSCT process (21,22). The potential of these technologies to increase patient comfort, support psychological well-being, and strengthen nurse-patient communication indicates that digital nursing practices will likely be used more widely in the future.



The evidence shows that psychosocial interventions are an integral part of patient- and family-centred care. As in the example of parent psychoeducation put forward by Montgomery et al. (2024), the psychological support of patients' relatives can indirectly affect the symptom burden and quality of life of patients positively (23). This finding shows that nursing care should be designed not only for the individual but also for the family system and emphasises the importance of the “family-centred care” approach. Exercise-based interventions (Chiffelle et al., 2013; Hacker et al., 2006) were found to be effective in reducing fatigue, one of the most common symptoms in HSCT patients, and were found to make significant contributions to the quality of life by increasing physical functionality (25, 26). Integration of these interventions into nursing care allows the development of effective strategies for the management of complex and multidimensional symptoms such as fatigue.

Symptom management in the HSCT process inherently requires a multidisciplinary approach; however, nurses play a pivotal role as the primary coordinators of care due to their continuous, holistic engagement with patients across all stages of treatment. Beyond merely implementing interventions, nurses are instrumental in assessing symptom burden, tailoring individualised care plans, and facilitating communication among healthcare team members. Their role extends to education, psychosocial support, and the monitoring of complex symptom trajectories. Despite this central position, the specific contributions of nurses remain underrepresented in the literature. Therefore, future studies should focus on elucidating and evaluating the effectiveness of nurse-led interventions, particularly through randomised controlled trials (RCTs) and qualitative studies that explore patient and caregiver perspectives. Special attention should also be paid to diverse settings and populations, such as paediatric HSCT patients and caregivers, to develop more inclusive and evidence-based nursing practices (23,25,29,30,31).

In the light of all these findings, it is concluded that symptom management in the HSCT process is not only a supportive practice for the nursing discipline, but also a comprehensive and dynamic process at the centre of professional care. Increasing the methodological diversity in the literature and developing intervention models specific to different age groups, cultural contexts and clinical situations are of great importance in terms of strengthening nursing practices. In addition, further research is needed to identify symptom clusters specific to HSCT and biomarkers that can be used in the management of these symptoms. This study aims to support evidence-based decision-making processes

in nurses' symptom management practices for HSCT patients, increase the effectiveness of individualised care plans, and shape the research agenda for the field. In this context, health policies, nursing education and clinical practice should address symptom management as a strategic priority (30,31,32).

CONCLUSION

This scoping review, supported by bibliometric analysis, synthesises symptom management strategies in HSCT patients, emphasising nursing-led interventions. Key approaches include pharmacological treatments, psychological support, and physical therapies. However, there are significant gaps in psychosocial care and the integration of technologies like virtual and augmented reality. No consensus exists on effective interventions for persistent symptoms such as fatigue, pain, nausea, and psychological distress, underscoring the need for personalised, multidimensional care plans that address both physical and emotional well-being. While the findings highlight the increasing focus on nursing and psychological support, optimising symptom management requires cohesive interdisciplinary collaboration. Collaborative frameworks that leverage the expertise of all healthcare team members are critical for improving outcomes. Furthermore, most studies originate from a limited number of countries, potentially constraining the cultural applicability of the findings. Future research should include more diverse populations and settings to enhance the relevance of evidence-based symptom management strategies globally.

Limitations

This study has several limitations. Restricting the literature search to WoS may have excluded relevant studies from databases such as PubMed and Scopus. The inclusion of only English-language publications further narrows the scope. Of the 57 identified studies, only 15 focused on nursing, limiting perspectives on symptom management in HSCT. The absence of a critical appraisal hinders the evaluation of methodological rigour, while the bibliometric analysis, centred on co-authorship networks and keyword co-occurrences, lacks qualitative depth. Variability in the study designs and patient populations also limits generalizability. Despite these constraints, the study provides valuable insights into research trends and key symptom management strategies in HSCT nursing. Future research should expand the database coverage, incorporate non-English studies, and employ systematic review methodologies for a more comprehensive synthesis.





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