European Journal of Oncology Nursing 80 (2026) 103107

Contents lists available at ScienceDirect

European Journal of Oncology Nursing

journal homepage: www.elsevier.com/locate/ejon

Review Article

# Effectiveness of nurse-led interventions on self-care behaviors of patients living with cancer: A systematic review

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ARTICLE INFO

*Keywords:*
Self-care behaviors
Self-care maintenance
Self-care monitoring
Self-care management
Nursing
Nurse-led interventions
Systematic review
Cancer
Cancer nursing
Self-care

ABSTRACT

*Purpose:* To synthesize evidence on nurse-led interventions for improving self-care behaviors in patients living with cancer, to examine methods and tools used to measure the effectiveness of nurse-led interventions, and to evaluate the impact of nurse-led interventions on self-care behavior outcomes.

*Methods:* Following PRISMA guidelines, a systematic review was conducted using the MEDLINE, PsycINFO, CINAHL, and Cochrane Library databases, covering the period from January 2014 to March 2025. To ensure transparency, the review protocol was registered on PROSPERO. The study selection, data extraction, and synthesis were performed independently by two reviewers. The screening of studies was managed using Rayyan software. A deductive approach was followed to identify self-care behaviors from the selected studies, using the definition of self-care behaviors as outlined in Riegel's Middle-Range Theory of Self-Care.

*Results:* This review included nine nurse-led intervention studies that aimed to improve self-care behaviors in patients living with cancer. Following Riegel's framework, several self-care behaviors were identified under three domains that are: self-care maintenance, monitoring, and management. These behaviors included medication adherence; dietary adjustments; engagement in exercise, sleep, and rest routines; symptom monitoring; and seeking advice when needed. This review identified several key features of nurse-led interventions, which contributed to the improvements in self-care behaviors and health outcomes. Teaching and education, skills-building and motivational coaching, continuous support, an individualized approach, family involvement, and pragmatic feasibility of the implemented strategies were the key features of the nurse-led interventions that supported the self-care behaviors of patients living with cancer. Most of the interventions were delivered face-to-face. A range of assessment tools were used to evaluate the outcomes of the interventions.

*Conclusion:* Nurse-led interventions demonstrated a positive influence on self-care behaviors and health outcomes, including improved medication adherence, reduction in pain, fatigue and symptom burden, enhanced physical functioning, and better quality of life. Interventions appeared to be effective when they incorporated multiple strategies and targeted specific symptoms or behaviors.

## 1. Background

Cancer is a prominent global health concern, accounting for 9.7 million deaths annually and with nearly 20 million new cases each year (World Health Organization, 2021). Lung, breast, and colorectal cancers collectively constitute two-thirds of these cases globally (Ferlay et al., 2018), and projections for 2050 predict an alarming (77%) increase in these numbers (World Health Organization, 2021). Patients with cancer face multiple challenges, including disease-related complications, and may experience frequent hospitalizations due to harmful side effects of treatment (Shalata et al., 2024). These challenges are linked to a limited understanding of the disease, the complex nature of treatment regimens, and the emotional exhaustion caused by a long-term health problem (Bergerot et al., 2024). To address these challenges, patients are often required to adopt ongoing self-care behaviors to enhance overall quality of life (QoL) (Plutynski, 2021).

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https://doi.org/10.1016/j.ejon.2026.103107
Received 3 October 2025; Received in revised form 13 January 2026; Accepted 14 January 2026
Available online 17 January 2026

Self-care behaviors refer to the specific, actionable steps that individuals take to promote health and manage illness (Riegel et al., 2012). According to the middle-range theory of self-care (Riegel et al., 2012, 2018), self-care behaviors are categorized under three domains: self-care maintenance, self-care monitoring, and self-care management. Self-care maintenance includes routine activities such as adhering to prescribed medications, following dietary modifications, engaging in physical activity, and maintaining adequate sleep and rest. Self-care monitoring involves observing the body for changes and tracking symptoms. Self-care management refers to the actions taken in response to symptoms when they appear.

With chronic health problems including cancer, patients require continuous and coordinated support to effectively manage both their disease and treatment challenges. Among healthcare personnel, nurses often spend the most time with patients; therefore, nurses are positioned on the care ladder to coordinate between patients and other healthcare providers to facilitate integrated care (Norlyk et al., 2013). Nurses monitor patients' symptoms and implement timely interventions to prevent the development of complications. Nurse-led interventions refer to interventions that are planned, designed, executed, and evaluated by nurses (Bulto and Hendriks, 2024). Through education and counseling, nurses help patients to understand complex medical information and treatment challenges (Rimmer and Sharp, 2021). Nurses also teach patients on self-care behaviors for the management of chronic health problems, and they support patients in adopting these behaviors (Brijmohan and Luigi, 2022). Beyond physical symptoms, patients with cancer also experience anxiety, depression, and emotional distress, which may negatively impact their self-care behaviors and overall health outcomes (Han et al., 2022). Nurses also support patients in managing their psychological challenges by identifying coping strategies (Mohammadipour et al., 2021). Given the aforementioned reasons, nurse-led interventions could be effective in enhancing patients' self-care behaviors and managing symptoms proactively.

Existing reviews of nurse-led interventions within cancer care have primarily focused on symptoms management and self-management (Cheng et al., 2018; Kelly et al., 2022a,b; Kwok et al., 2022; Lanfear and Harding, 2023; Sahu et al., 2023; Tuominen et al., 2019). For example, two reviews (Kelly et al., 2022a,b; Kwok et al., 2022) reported the effectiveness of nurse-led interventions on managing symptoms such as fatigue, nausea, anxiety, and depression. However, these reviews did not specify which self-care behaviors were adopted by the patients to achieve symptom relief. Similarly, two reviews (Sahu et al., 2023; Lanfear and Harding, 2023) reported that telephone-based support for medication by nurses led to improved medication adherence; however, the researchers did not report which self-care behaviors of the patients facilitated the medication adherence. A meta-analysis (Cheng et al., 2018) reported benefits of nurse-led interventions on issues such as constipation, insomnia, and financial strain, but the review did not identify the underlying self-care behaviors that may have contributed to improvement in these outcomes. Furthermore, an umbrella review (Tuominen et al., 2019) found that nurse-led interventions were associated with improvements in fatigue, sleep, and spiritual well-being. However, there has been no synthesis of self-care behaviors or a detailed investigation of how the interventions support these behaviors to improve overall health outcomes. There is an apparent gap in the existing literature regarding self-care behaviors, yet a comprehensive understanding of these behaviors is essential in cancer care as they influence treatment effectiveness and patient outcomes. In response to the gap, this review systematically examines the features of a nurse-led intervention that facilitated patients in engaging in a wide range of self-care behaviors, with the goal of informing the design of future nurse-led interventions.

Promoting self-care behaviors can enhance patients' engagement and confidence in managing their health (Mazhari and Khoshnood, 2024). Several strategies can be used to promote patients' self-care behaviors, such as teaching, counseling, skills-building, coaching, enhancement of self-efficacy, provision of social support, regular follow-ups and feedback (Schulman-Green et al., 2012). When patients receive adequate information from nurses about their health problem and its management, they report higher satisfaction with nursing care and better QoL (Molassiotis et al., 2015). Despite the well-established benefits of self-care behaviors and the critical role of nurses in educating and supporting patients in their self-care behaviors, there is limited evidence on how nurse-led interventions promote these behaviors in cancer care. Therefore, synthesizing the evidence on the identified gaps in the literature is essential to develop a comprehensive understanding of this phenomenon.

## 2. Aim of the review

The aim of this systematic review is to provide an overview of nurse-led interventions designed to improve self-care behaviors among patients living with cancer. This systematic review addresses the following questions:

1. What are the types of nurse-led interventions and their respective characteristics designed to improve self-care behaviors of patients living with cancer?
2. What type of measures/tools have been used to assess the effects of nurse-led interventions designed to improve self-care behaviors among patients living with cancer?
3. What are the effects of nurse-led interventions on self-care behavior outcomes in patients living with cancer?

## 3. Methods

This systematic review of the literature focuses on the effectiveness of nurse-led interventions on self-care behaviors among patients living with cancer. The study protocol was registered on PROSPERO under the ID: CRD42023480466.

### 3.1. Search strategy

A comprehensive search across Medline, PsycINFO, CINAHL, and the Cochrane Library was employed. A manual search of reference lists was conducted to ensure comprehensive coverage of the literature. Search operators like quotation marks, asterisks, and Boolean terms (AND, OR, NOT) were used to refine the search strategy. The search used MeSH terms including "self-care," "self-care behaviors," "self-care maintenance," "self-care monitoring," "self-care management," "program," "pre-post," "quasi-experimental," "RCT," "experimental," "controlled clinical trial," "neoplasms," "melanoma," "carcinoma," and "leukemia." The search focused on studies with adult participants and was filtered to find English-language publications from 2014 to 2025. We acknowledge that this restriction may have excluded earlier behavioral interventions, published prior to 2014. Results were limited to this period to reflect advances in cancer treatments, new nurse-led interventions, and alignment with current guidelines and patient needs. Search results were imported into Zotero for duplicate removal, then into Rayyan for blind review by two researchers (SB, SY) to screen titles and abstracts. This review followed PRISMA guidelines for planning, execution, and reporting (Page et al., 2021). For details on the search strategy, see supplementary file A.

### 3.2. Inclusion and exclusion criteria

The following inclusion criteria were used for the selection of studies: (1) studies involving patients with cancer (solid tumor or hematological) in the active treatment phase, from the start of treatment to completion, including surgery, chemotherapy, radiation, immunotherapy, or targeted therapy; (2) studies that reported self-care behaviors, as defined by Riegel's Self-Care of Chronic Illness Theory; (3)

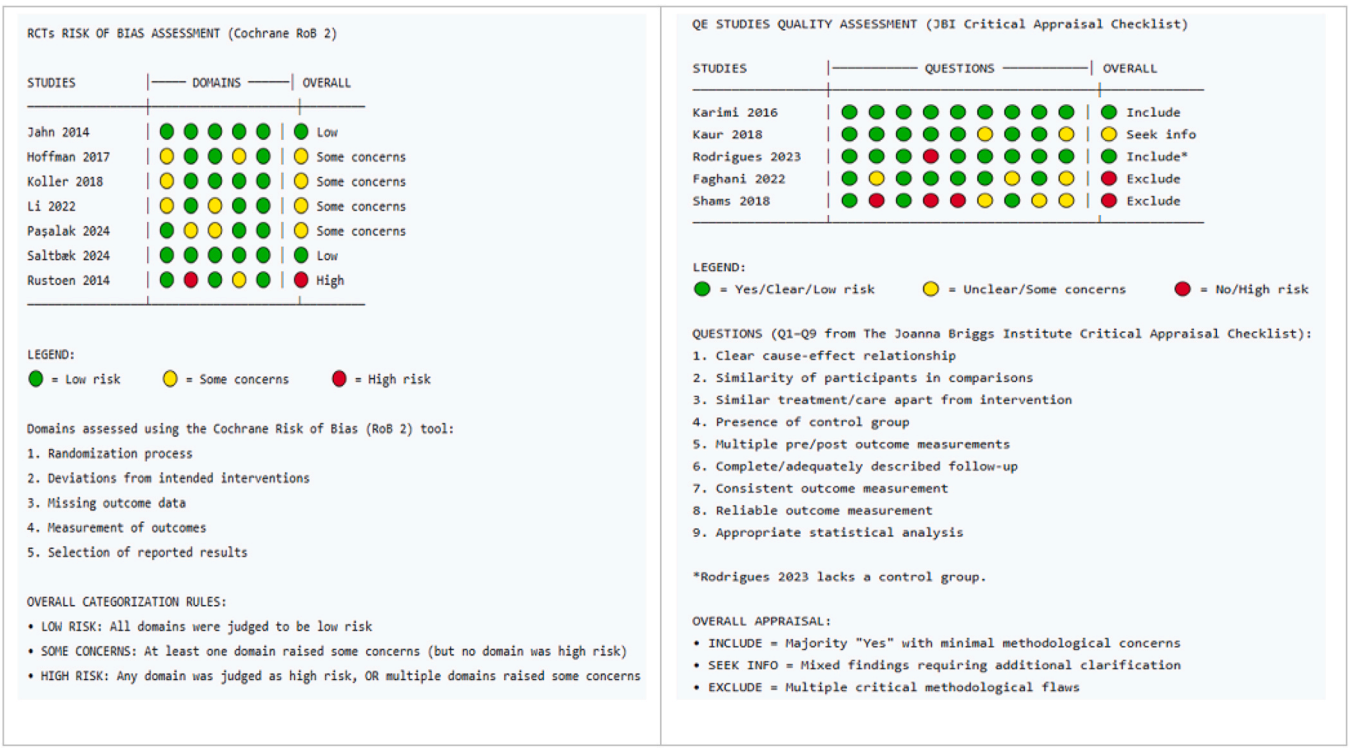


**Fig. 1.** Quality assessment of the included studies.

studies in which the intervention was delivered by nurses, including those that incorporated patient education materials in paper or digital format as supplementary sources along with active nurse-patient engagement; and (4) randomized controlled trials, quasi-experimental, or pre-post intervention studies. The exclusion criteria were as follows: (1) studies that only used patient education materials in paper or digital format (e.g., pamphlets, websites) without any active nurse-led interaction; (2) systematic reviews or meta-analyses; (3) other publication types, such as abstracts, pictorials, congress communications, letters, or books; (4) articles reporting on instrument development or testing; (5) articles with missing information about self-care behaviors and no author response to data requests; (6) articles assessed as having a high risk of bias using the Cochrane Risk of Bias tool or the Joanna Briggs Institute (JBI) Critical Appraisal Checklist; and (7) studies involving patients receiving only oral anticancer drugs were excluded, as the management of these patients may differ from those receiving intravenous or combined chemotherapy. Additionally, one review specifically addressing the self-care behaviors among patients on oral chemotherapy drugs and is already available and published (Di Nitto et al., 2022).

### 3.3. Quality appraisal

The Cochrane Risk of Bias (RoB-2) was used to evaluate randomized controlled trial (RCT) studies and assigned a judgment of "low risk of bias," "some concerns," or "high risk of bias." (Higgins et al., 2019). Each RCT was evaluated across the five RoB-2 domains such as: randomization, intervention deviations, missing data, outcome measurement, and result reporting (Fig. 1). When all domains were judged to be low risk then the studies were rated as overall low risk of bias. When at least one domain raised some concerns then the studies were rated as overall some concerns. Studies were rated as overall high risk of bias if any domain was judged to be high risk, or if multiple domains raised some concerns.

The Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Non-Randomized Experimental Studies was used to assess the quality of Quasi-Experimental (QE) studies (Barker et al., 2024). Each QE study was evaluated across the nine checklist items to determine methodological quality, clarity of cause and effect, similarity of participants, adequacy of control group, reliability of outcome measurement, completeness of follow-up, and appropriateness of statistical analysis (Fig. 1). The overall risk of bias was determined based on the evaluation of individual domains. When all or the majority of checklist items were adequately addressed (yes), indicating low risk of bias then the study is assigned as "include". When some items were partially addressed (unclear) the study is assigned as "seek further info". When key items were not addressed (no) then the study is assigned as "exclude".

A domain-level summary table for each RCT across all five RoB-2 domains and item-level assessments from the JBI Critical Appraisal Checklist for QE studies along with the corresponding judgments is provided in Supplementary file C, allowing clear transparency regarding how the overall risk-of-bias judgments were determined.

Contact with the original authors was initiated when additional information was needed. Four studies were excluded because information on whether the intervention was nurse-led was not provided (Spoelstra et al., 2017; Olesen et al., 2019; ArbabiSarjou et al., 2022; Rakhshani et al., 2022), and three studies were excluded from the final analysis due to high risk of bias or low quality (Rustøen et al., 2014; Shams et al., 2018; Faghani et al., 2022). Exclusion decisions were made with careful consideration to maintain the robustness and validity of the synthesized findings.

### 3.4. Selection of studies and data extraction

Two researchers (SB & SY) conducted the data selection, extraction, and synthesis independently. Initially, titles and abstracts were screened independently by two researchers (SB & SY). Disagreements were resolved through discussion between the researchers (SB & SY). Studies that passed the initial screening phase underwent a thorough full-text assessment, which was conducted independently by both researchers, and discrepancies in evaluation were resolved by involving a third researcher (MS).

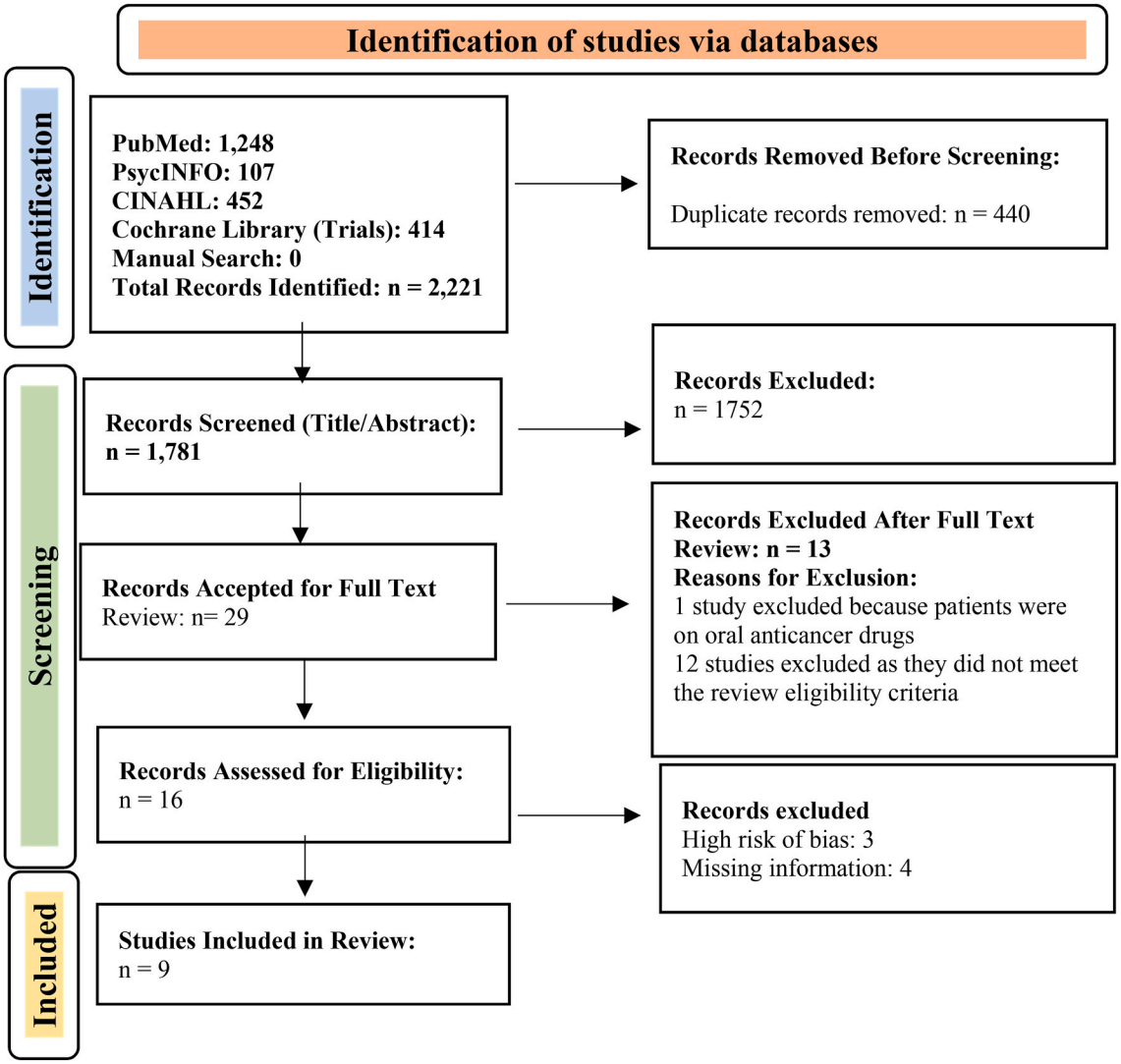


**Fig. 2.** PRISMA flow chart depicting the study selection process and the rationale for exclusion.

One researcher (SB), carried out the data extraction using a standardized Microsoft Excel sheet, specifically designed for this review. A second researcher (SY) validated the accuracy of the extracted data. The extracted information covered study characteristics, including authors and publication year, country, cancer type, intervention and control groups. The intervention components, such as dose, frequency, duration, mode of delivery, and comparison groups, were described. The data extraction sheet also included outcome measures and assessment tools used for data collection. Effect of the intervention was recorded using design-appropriate criteria. For RCTs, the effect of the intervention was determined based on differences between the intervention and control groups at follow-up. For quasi-experimental studies, the effect of the intervention was identified based on within-group changes from baseline to follow-up in the intervention group.

### 3.5. Data analysis

The data analysis was conducted systematically, guided by the review questions. First, we extracted and summarized the self-care behaviors measured directly or indirectly in the included studies (n = 9). A deductive theory-driven approach was used to identify self-care behaviors from the selected studies, based on the Riegel's Middle-Range Theory of Self-Care (Riegel et al., 2012, 2018).

Next, key features of the nurse-led interventions supporting patients' self-care behaviors were identified by examining the intervention content across studies and by identifying consistent patterns in interventions on strategies, delivery modes, and targeted behaviors and health outcomes. These features were then verified through discussion in research team meetings.

Due to significant variability in study designs, interventions, and outcomes, a meta-analysis was not feasible. Therefore, we conducted a structured narrative synthesis informed by the SWiM (Synthesis Without Meta-analysis) reporting guidelines. For each study, we mapped the intervention features, effects on self-care behaviors and related health outcomes. This allowed us to identify consistent patterns and make comparison across studies that how specific intervention features were associated with improvements in self-care behaviors and health outcomes. A harvest plot was used to summarize the direction of effects across studies and to make comparisons between studies based on self-care behaviors, intervention features, and outcome effects. The intervention effects were summarized by indicating the direction of change in outcomes (↑ = increase, ↓ = decrease, and 0 = no effect). The corresponding statistical parameters, including mean differences, odds ratios, effect sizes, confidence intervals, and p-values, are presented in the supplementary material (File B). Measurement tools and outcomes used to assess intervention effects were also recorded.

**Table 1**
Characteristics of the studies (n = 9).

| S. # | Authors and Publication Year | Country | Cancer Type | IG | CG | Age Mean ± SD | Setting | Duration of Intervention | Risk of Bias |
|---|---|---|---|---|---|---|---|---|---|
| Randomized Controlled Trials (n = 6) | | | | | | | | | |
| 1. | Jahn et al. (2014) | Germany | Non-specific cancer types: Gynecologic Tumors, Urologic Tumors, Hematological Malignancies, GI Tumors, Others | 135 | 128 | IG: 57.75 ± 11.97 CG: 55.90 ± 12.62 | Oncology Medical/ Surgical Wards | 2 weeks | Low Risk |
| 2. | Hoffman et al. (2017) | USA | Lung Cancer | 37 | 35 | IG: 67.4 ± 9.7 CG: 65.6 ± 10.1 | Postsurgical Units + Home | 6 weeks | Some Concerns |
| 3. | Koller et al. (2018) | Germany | Non-specific cancer types: Gastrointestinal, Lung, Multiple Myeloma, Breast, Gynecological | 20 | 19 | IG: 55.3 ± 10.2 CG: 58.1 ± 11.2 | Palliative Care Unit | 6 weeks | Some Concerns |
| 4. | Li et al. (2022) | China | Rectal | 33 | 33 | IG: 60.5 ± 9.2 CG: 61.3 ± 10.2 | Gastric Wards | 24 weeks | Some Concerns |
| 5. | Paşalak et al. (2024) | Turkey | Ovarian Cancer | 20 | 21 | IG: 57.1 ± 12.6 CG: 57.5 ± 12 | Outpatient Chemotherapy Unit | 15 weeks | Some Concerns |
| 6. | Saltbæk et al. (2024) | Denmark | Early-stage breast cancer (Stage I–II) | 251 | 252 | IG: 59.71 ± 9.43 CG: 60.08 ± 9.65 | Oncology and Palliative Care Units | 156 weeks | Low Risk |
| Quasi-Experimental (n = 3) | | | | | | | | | |
| 7. | Karimi et al. (2016) | Iran | Colon, Rectum, Colorectal | 35 | 35 | IG: 54 ± 7.61 CG: 54 ± 7.89 | Oncology, Radiotherapy and Chemotherapy Units | 8 weeks | Include |
| 8. | Kaur et al. (2018) | India | Cervical Cancer | 30 | 30 | IG: 54.00 ± 10.72 CG: 49.20 ± 10.73 | Radiotherapy Unit | 4.5 weeks | Seek further info |
| 9. | Rodrigues et al. (2023) | Portugal | Breast Cancer | 48 | – | IG: 49.2 ± NR | Breast Center | 12 weeks | Include |

**Abbreviations:** IG = Intervention Group; CG = Control Group; SD = Standard Deviation; NR = Not Reported. Note: Rogers et al. (2023) used no-control (single-group) design.

## 4. Results

From an initial pool of 2221 references, 9 studies were included in the final review (Fig. 2), of which six were randomized controlled trials (RCTs) and three were quasi-experimental (QE) studies. Of the six randomized controlled trials, four studies (Hoffman et al., 2017; Koller et al., 2018; Li et al., 2022; Paşalak et al., 2024) showed some concerns (moderate risk of bias), while two studies (Jahn et al., 2014; Saltbæk et al., 2024) were judged to be at low risk of bias. The three quasi-experimental studies were appraised separately due to differences in study design, with two studies meeting inclusion quality criteria (Karimi et al., 2016; Rodrigues et al., 2023) and one study requiring further methodological clarification (Kaur et al., 2018). Seven additional studies were excluded at the full-text screening stage for reasons such as missing information on the nurse-led intervention (n = 4) or high risk of bias/low quality (n = 3) (Supplementary File C).

### 4.1. Characteristics of the included studies

The included studies (n = 9) were conducted in different regions of the world (Table 1), including Europe (n = 5: Germany [2], Denmark, Turkey, Portugal), Asia (n = 3: China, Iran, India), and North America (n = 1: USA). Studies were conducted in various clinical settings, such as outpatient oncology units, chemotherapy units, oncology wards, cancer surgical units, radiotherapy units, and palliative cancer care services. Intervention duration varied significantly, ranging from 2 weeks (Jahn et al., 2014) to 156 weeks (Saltbæk et al., 2024). Sample sizes also varied, from a minimum of 20 participants (Koller et al., 2018) to a maximum of 251 participants (Saltbæk et al., 2024). The majority of the studies focused on specific cancer types, such as lung, ovarian, cervical, and breast cancers, while others included multiple cancer types (e.g., gynecologic, urologic, and hematological malignancies). Notably, one study lacked a control group, highlighting methodological diversity (Rodrigues et al., 2023).

### 4.2. Types and characteristics of nurse-led interventions

In general, the nurse-led interventions aimed to address a variety of physical and psychological symptoms. Some interventions focused on specific symptoms (e.g., pain, fatigue, anxiety, depression, lymphedema, and bowel symptoms), and some aimed to improve overall symptoms and QoL (Tables 2 and 3). Several interventions were grounded in theoretical frameworks, including Orem's Self-Care Deficit Nursing Theory (Karimi et al., 2016), the Theory of Symptom Self-Management, the Transitional Care Model (Hoffman et al., 2017), the Behavior Change Theory (Koller et al., 2018), and the Symptom Management Model (Paşalak et al., 2024).

After analysis, different features of nurse-led interventions were identified based on their focus and approach: (i) teaching and educational interventions, (ii) skills-building and motivational coaching (iii) technology-based interventions (iv) individualized approach, (v) continuous support, (vii) family/caregiver involvement and (vi) pragmatic feasibility.

The most common feature of the nurse-led interventions, found in

**Table 2**
Description of intervention types, characteristics, and self-care behaviors.

| Randomized Controlled Trials (n = 6) | | | | | |
|---|---|---|---|---|---|
| Aim/Purpose of study | Focus of intervention | Intervention strategies | Mode of delivery | Timing and frequency | Envisaged self-care behaviors (Mtn/Mon/Mgt) |
| Evaluate a nursing program (SCION-PAIN) to reduce barriers and improve pain management and discharge management (Jahn et al., 2014) | Improve cancer pain management at home | **Counseling, Education, and Skills/Training:**<br>• Counseling on common barriers to pain management (i.e., fear of addiction or hesitation to report pain)<br>•Education on opioid use and distribution of booklet titled "Leaving the Pain Behind".<br>•Pain diary to track and monitor pain levels<br>•Training in Progressive Muscle Relaxation (PMR) techniques.<br>•Provision of PMR compact disc (CD) for practice at home<br>•Discharge checklist on medication information and follow-up plan | •Individual or group sessions conducted face-to-face, with follow-up via telephone | •Initial session within 24 h of admission<br>•Follow-up sessions every 3rd day during hospitalization<br>•One session before discharge<br>•Follow-up phone calls 2–3 days post-discharge | •Adhering to prescribed medication by integrating it into daily routines (Mtn)<br>•Practicing relaxation techniques (e.g., PMR) (Mtn)<br>•Tracking pain intensity and symptoms using a pain diary (Mon)<br>•Responding to early signs of symptoms worsening (Mgt)<br>•Engaging in follow-up communication (Mgt) |
| Effect of postsurgical exercise intervention on self-efficacy and fatigue management ( Hoffman et al., 2017) | Improve cancer-related fatigue self-management and physical functioning | **Education, Training, and Counseling:**<br>•Self-management for fatigue<br>•Training in balance exercise using gaming software<br>•Guidance on maintaining a diary for symptoms, adverse events, and exercise<br>•Safety education and use of excursion scale<br>•Provision of structured exercise plan and checklist for monitoring | •Face-to-face individual sessions, home visits, follow-up phone calls | •Phone contact within 24 h post-discharge and then in weeks 3–6<br>•Home visit in week 2 and extra visits if needed<br>•Walking and balance exercises 5 days/week increased weekly to 30 min/day | •Adhering to daily walking and balance exercises (Mtn)<br>•Tracking fatigue levels regularly (Mon)<br>•Tracking exercise timings (Mon)<br>•Adjusting exercise intensity as needed (Mgt) |
| Effectiveness of ANtiPain intervention on pain intensity, functioning, self-efficacy, and managing barriers (Koller et al., 2018) | Improve pain management | **Education, Coaching, and Skills/Building:**<br>•Education on pain management using booklets and laminated cards<br>•Coaching on habit formation (e.g., integrating medications into daily routines, using pillboxes)<br>•Training in pain self-monitoring<br>•Guidance on prescription details, addressing intake errors, and setting medication goals<br>•Caregiver involvement to support medication adherence | •One-on-one in-hospital sessions before discharge, telephone follow-up post-discharge | •One 60-min session in hospital.<br>•20-min follow-up phone calls 1 and 6 weeks after discharge | •Maintaining medication schedule by using pillboxes (Mtn)<br>•Monitoring pain intensity, medication side effects, and functional ability using tracking tools (Mon)<br>•Adjusting medication timing as needed (Mgt)<br>•Seeking medical support when pain becomes unmanageable (Mgt) |
| Impact of a self-management program on bowel symptoms (Li et al., 2022) | Improve bowel dysfunction symptoms | **Education, Training, and Guidance:**<br>•Training on pelvic floor exercises, including defecation reflex and posture<br>•Guidance on perianal hygiene<br>•Instructions for managing frequent defecation or urgency: avoid spicy, cold, and irritating foods; anti-diarrheal medications (e.g., loperamide)<br>•Instructions for managing constipation: increase fiber and fluid intake; consider mild laxatives (e.g., lactulose); avoid irritants | •Face-to-face individual sessions then follow-up via telephone call or WeChat | •One 30–60min session 2–3 weeks post-surgery.<br>•Weekly calls for 4 weeks, then bi-weekly until 6 months | •Following a prescribed dietary plan (Mtn)<br>•Taking medications as instructed (Mtn)<br>•Performing pelvic floor exercises (Mtn)<br>•Performing perianal skin care (Mtn)<br>•Recording bowel symptoms (Mon)<br>•Practicing defecation reflex training (Mgt) |
| Impact of intervention on symptom severity, management, and QoL ( Paşalak et al., 2024) | Improve symptom management and QoL | **Education, Counseling, and Training:**<br>•Education and counseling on symptoms monitoring and management through evidence- | •Face-to-face, individualized sessions | •30–45 min sessions per chemotherapy cycle | •Tracking symptom severity and recognizing early signs of complications (Mon) |

(*continued on next page*)

**Table 2** (*continued*)

| Aim/Purpose of study | Focus of intervention | Intervention strategies | Mode of delivery | Timing and frequency | Envisaged self-care behaviors (Mtn/Mon/Mgt) |
|---|---|---|---|---|---|
| Randomized Controlled Trials (n = 6) | | | | | |
| | | based brochures at each chemo-therapy session<br>•Training on breathing exercises | | | |
| To evaluate the effectiveness of a nurse-led follow-up program on patient-reported outcomes and symptoms self-management (Saltbæk et al., 2024) | Improve self-management of symptoms | **Education and Counseling:**<br>•Education on symptoms self-management through Guided Self-Determination (GSD) reflection method and problem-solving tools.<br>•Individualized counseling as per patient needs<br>•Use of Patient-Reported Outcome Measures (PROMs) for regular symptoms tracking<br>•Provision of information on self-care strategies when symptoms scores exceeded thresholds | •In-person GSD sessions<br>•Remote ongoing follow-up primarily via phone and electronic PROMs assessments | •3 to 5 sessions within the first 6 months<br>•Symptom monitoring via PROMs at 0, 3, 6, 9, 12, 18, 24, 30, and 36 months | •Regularly tracking symptoms using PROMs (Mtn)<br>•Tracking symptom severity (Mon)<br>•Adjusting physical activity according to symptoms severity (Mgt)<br>•Adjusting diet based on current health needs and symptoms (Mgt)<br>•Initiating consultations with nurses when experiencing new or worsening symptoms (Mgt) |
| **Quasi-Experimental Studies (n=3)** | | | | | |
| Effects of Orem's self-care model on the nutritional status and fatigue (Karimi et al., 2016) | Improve nutrition, fatigue, physical activity, sleep quality, and mental health | **Education and Counseling:**<br>•Education on nutrition, fatigue, and sleep management<br>•Individualized counseling sessions involving patients and family members<br>•Provision of self-care checklists | •Face-to-face meetings with ongoing follow-up | •Five sessions, 60 min each, based on patient needs | •Practicing relaxation techniques (e.g., PMR) during episodes of pain or fatigue (Mtn)<br>•Adjusting diet based on symptoms or treatment side effects (Mgt) |
| Effectiveness of the intervention package on anxiety, depression, and fatigue levels (Kaur et al., 2018) | Reduce anxiety, depression, and fatigue | **Education, Counseling, and Training:**<br>•Education and counseling sessions on diet and side effects<br>•Provision of self-care information booklets<br>•Training in Jacobson Progressive Muscle Relaxation (JPMR) exercises | •In-person | •Seven JPMR sessions over 4.5 weeks, with counseling in the 1st and 3rd weeks | •Performing daily JPMR exercises (Mtn)<br>•Attending counseling sessions (Mtn)<br>•Tracking symptoms of anxiety, depression, and fatigue (Mon)<br>•Making dietary modifications based on side effects (Mgt) |
| Effectiveness of a rehabilitation-nursing program in improving self-care performance (Rodrigues et al., 2023). | Reduce upper limb disability and improve functioning | **Education and Training:**<br>•Education on lymphedema risk reduction<br>•Training of upper limb, cervical spine exercises, and scar massages. | •In-person with weekly home visits | •Daily exercises for three months | •Performing mobilization exercises (Mtn)<br>•Massaging surgical scars (Mtn)<br>•Tracking symptoms using visual aids/flyers (Mon) |

**Abbreviations:** CD – Compact Disc, CG – Control Group, GSD – Guided Self-Determination, IG – Intervention Group, JPMR – Jacobson Progressive Muscle Relaxation, Mgt – Management, Mon – Monitoring, Mtn – Maintenance, NR – Not Reported, PMR – Progressive Muscle Relaxation, PROMs – Patient-Reported Outcome Measures, SCION-PAIN – Self-Care Interventions for Oncology Nursing – Pain, SD – Standard Deviation.

**Table 3**
Summary of intervention features in the included studies.

| Sr # | Study | Education | Skills-Building and Coaching | Individualized Approach | Pragmatic Feasibility | Continuous Support | Family/Caregiver Involvement |
|---|---|---|---|---|---|---|---|
| 1 | Jahn et al. (2014) | Yes | Yes | Yes | Yes | Yes | No |
| 2 | Hoffman et al. (2017) | Yes | Yes | Yes | Yes | Yes | No |
| 3 | Koller et al. (2018) | Yes | Yes | Yes | Yes | Yes | No |
| 4 | Li et al. (2022) | Yes | Yes | Yes | Yes | Yes | No |
| 5 | Paşalak et al. (2024) | Yes | Yes | Yes | Yes | No | No |
| 6 | Saltbæk et al. (2024) | Yes | No | Yes | Yes | Yes | No |
| 7 | Karimi et al. (2016) | Yes | No | Yes | Yes | Yes | Yes |
| 8 | Kaur et al. (2018) | Yes | Yes | Yes | Yes | No | No |
| 9 | Rodrigues et al. (2023) | Yes | Yes | No | Yes | Yes | No |

Yes = the feature was included as a defined component of the intervention; No = the feature was not included in the intervention. Education: Provision of teaching sessions, supported by written or digital materials. Skills-Building and Coaching: Teaching hands-on skills, including symptom monitoring using scales, performing exercises, massage, skin care, and guided practice with coaching. Continuous Support: Ongoing follow-up through phone calls, digital communication, or home visits. Individualized Approach: Assessing individual patient needs and tailoring interventions accordingly. Family/Caregiver Involvement: Engaging family members to support patients during the intervention period. Pragmatic Feasibility: Ensuring the intervention is practical in real-world settings, considering patient circumstances and resources.

**Table 4**
Description of measurement tools and the study outcomes.

| Randomized Controlled Trials (n = 6) | | | | | | |
|---|---|---|---|---|---|---|
| First Author, Year | Measurement Tool | Behavior Measurement Classification (Direct or Indirect) | Time of Measurement | Time Point(s) Reported | Key Findings | Results Interpretation |
| Jahn et al. (2014) | •German Pain Coping Questionnaire (FESV-BW)<br>•Barriers (to cancer pain management) Questionnaire II (BQ II)<br>•Medication Adherence Scale (MAS)<br>•Brief Pain Inventory (BPI)<br>•European Organization for Research and Treatment in Cancer Quality of Life Questionnaire-C30 (EORTC QLQ-C30) | MAS = direct; BPI, EORTC QLQ-C30 = indirect | 2–3 days after discharge | 7th day post-discharge | 1. Cancer pain management knowledge: ↑<br>2. Cognitive barriers: ↓<br>3. Self-care measures knowledge: ↑<br>4. Adherence to pain medication: ↑<br>5. Pain intensity: ↓<br>6. Coping: ↑<br>7. HRQoL: ↑ | Improved knowledge and reduced barriers to pain management, better adherence to pain medications and enhanced pain control, improved coping mechanisms, and better QoL |
| Hoffman et al. (2017) | •Brief Fatigue Inventory (BFI)<br>•Perceived Self-Efficacy for Fatigue Self-Management (PSEFSM)<br>•Perceived Self-Efficacy for Walking Duration Instrument<br>•Activities-Specific Balance Confidence Scale<br>•Weekly Diary<br>•6-Minute Walk Test (6MWT)<br>•Medical Outcomes Study Short Form 36 (SF-36) | Walking diary, 6MWT, exercise adherence = direct; fatigue, SF-36 = indirect | At week 2, 3, and 6 | 6th week post-surgery | 1. Fatigue: ↓<br>2. Walking time: ↑<br>3. Balance exercises: ↑<br>4. Functional capacity: ↑<br>5. Adherence to exercise: ↑ | Reduced fatigue levels and improved walking time, balance exercises, functional capacity (6MWT), and exercise adherence |
| Koller et al. (2018) | •Barriers Questionnaire (to cancer pain management) II (BQ-II)<br>•Brief Pain Inventory (BPI)<br>•Medical Outcome Study Short-Form (SF-36) | Pain, barriers to pain management, QoL: indirect | At week 1 and 6 and after discharge | 6th week post-discharge | 1. Pain intensity: ↓<br>2. Patient-related barriers to pain management: ↓<br>3. Physical & mental QoL: ↑ | Pain intensity and patient-related barriers to pain management decreased while physical and mental QoL improved |
| Li et al. (2022) | •Bowel Symptoms Self-Management Behaviors Questionnaire (BSSMBQ)<br>•European Organization for Research and Treatment in Cancer Quality of Life Questionnaire-C30 (EORTC QLQ-C30) | BSSMBQ = direct; EORTC QLQ = indirect | Every two weeks until six months after surgery | 6 months after surgery | 1. Bowel Symptoms Self-Management Behaviors total score: ↑<br>2. QoL total score: ↑ | Improvement in bowel symptoms self-care behaviors and QoL |
| Paşalak et al. (2024) | •Edmonton Symptom Assessment System (ESAS)<br>•Brief Sexual Symptom Control Checklist-Women (BSSC-W)<br>•European Organisation for Research and Treatment of Cancer Core Quality-of-Life Questionnaire (EORTC QLQ-C30) | Symptom burden, sexual symptoms, QoL: indirect | At baseline week 1/T1, third cycle week 6–7/T2, and last cycle week 15–16/T3 | Last chemotherapy cycle | 1. Edmonton Symptom Assessment Scale Scores: ↓<br>•Pain: ↓<br>•Fatigue: ↓<br>•Nausea: ↓<br>•Depression: ↓<br>•Anxiety: ↓<br>•Insomnia: ↓<br>•Loss of appetite: ↓<br>•Feeling of well-being: ↓<br>•Changes in skin and nails: ↓<br>•Mouth Sores: ↓<br>•Numbness in hands: ↓<br>2. Sexual Symptoms Satisfaction: ↓<br>•No interest in sex: ↓<br>•Decreased sensation of clitoris or vagina: No Change | Reduction in overall symptoms |

(*continued on next page*)

**Table 4** (*continued*)

| Randomized Controlled Trials (n = 6) | | | | | | |
|---|---|---|---|---|---|---|
| First Author, Year | Measurement Tool | Behavior Measurement Classification (Direct or Indirect) | Time of Measurement | Time Point(s) Reported | Key Findings | Results Interpretation |
| | | | | | •Decreased vaginal lubrication/dryness: ↓<br>•Orgasmic disorder: ↓<br>•Dyspareunia: ↓ | |
| Saltbæk et al. (2024) | •Functional Assessment of Cancer Therapy-Breast (FACT-B)<br>•Concerns About Recurrence Questionnaire<br>•Generalized Anxiety Disorder-7 (GAD-7<br>•Patient Health Questionnaire-9 (PHQ-9) | Anxiety, depression, QoL: indirect | At 0, 3, 6, 9, 12, 18, 24, 30, and 36 months | In the second year, after random assignment | 1. Fear of recurrence: ↓<br>2. Anxiety: ↓<br>3. Depression: ↓<br>4. QoL: ↑ | Reduction in fear of recurrence, anxiety, and depression and improvement in QoL |
| **Quasi-Experimental Studies (n=3)** | | | | | | |
| Karimi et al. (2016) | •Food Frequency Questionnaire (FFQ)<br>•Brief Fatigue Inventory (BFI) | FFQ = direct; fatigue = indirect | Patients were monitored for two months | Two months after the intervention | 1. Nutritional Status & Dietary Intake<br>•Overall nutritional status: ↑<br>•Bread & cereals intake: ↑<br>•Protein intake: ↑<br>•Dairy products intake: ↑<br>•Fruits intake: ↑<br>•Vegetables intake: ↑<br>2. Fatigue: ↓<br>3. Ability to walk: ↑<br>4. Self-care awareness: ↑ | Improvements in nutritional intake especially fruits, vegetables, and dairy products, and enhanced self-care awareness and walking ability, along with a reduction in fatigue |
| Kaur et al. (2018) | •Beck Depression Inventory (BDI)<br>•Zung Anxiety Scale<br>•Fatigue Scale | Psychological symptoms: indirect | At the end of intervention | 4½ week of the treatment | 1. Anxiety: ↓<br>2. Depression: ↓<br>3. Fatigue: ↓ | Reduced anxiety, depression, and fatigue |
| Rodrigues et al. (2023) | •Disabilities of the Arm, Shoulder and Hand (DASH) | Functional disability: direct; Psychological symptoms: indirect | In the 3rd month | 3rd month of post-intervention | 1. Disability: ↓<br>2. Self-Care: ↑<br>3. Daily Functioning Abilities: ↑ | Improved overall disability, reduced symptoms (pain, numbness, weakness, stiffness), and enhanced self-care and daily functional abilities |

**Abbreviations:** 6MWT – 6-Minute Walk Test, BDI – Beck Depression Inventory, BFI – Brief Fatigue Inventory, BQ II/BQ-II – Barriers (to cancer pain management) Questionnaire II, BPI – Brief Pain Inventory, DASH – Disabilities of the Arm, Shoulder and Hand, EORTC QLQ-C30 – European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30, FACT-B – Functional Assessment of Cancer Therapy-Breast, FFQ – Food Frequency Questionnaire, FESV-BW – German Pain Coping Questionnaire, GAD-7 – Generalized Anxiety Disorder-7, HRQoL – Health-Related Quality of Life, MAS – Medication Adherence Scale, PHQ-9 – Patient Health Questionnaire-9, PSEFSM – Perceived Self-Efficacy for Fatigue Self-Management, QoL – Quality of Life, SF-36/Medical Outcomes Study Short Form 36 – Medical Outcomes Study Short Form 36, Time of Measurement – indicates when the outcome was assessed post-intervention or post-discharge. Key Findings – for detailed statistical results, see Supplement B, Direction of effect – ↑ = improvement; ↓ = reduction.

almost all the studies, was that of **education and teaching**. Teaching mainly focused on disease-specific information, symptom causes and management, medication and dietary management, and self-care strategies (Jahn et al., 2014; Hoffman et al., 2017; Koller et al., 2018; Li et al., 2022; Paşalak et al., 2024; Saltbæk et al., 2024; Karimi et al., 2016; Kaur et al., 2018; Rodrigues et al., 2023). Educational information was delivered through individual or group sessions, augmented with written or digital materials to reinforce the required self-care behaviors. Especially in pain management studies, teaching was provided to address cognitive barriers such as the fear of addiction, the belief that pain is untreatable, concerns about side effects, and the fear of burdening healthcare professionals. Similarly, to support dietary behaviors, patients were taught about the consumption of fruits, vegetables, and dairy products in relation to food irritants and food-drug interactions.

**Skills-building and motivational coaching** comprised another core aspect of the nurse-led interventions (Jahn et al., 2014; Hoffman et al., 2017; Koller et al., 2018; Li et al., 2022; Paşalak et al., 2024; Kaur et al., 2018; Rodrigues et al., 2023). These aspects focused on training practical skills to improve physical functioning as well as managing symptoms such as fatigue, disability, anxiety, and pain. Nurses trained patients on how to use pain and fatigue scales, how to track symptoms in daily diaries, and how to do relaxation exercises. Nurses also coached patients, through motivational techniques, on adopting and sustaining behaviors required for medication management. For instance, to support medication adherence, patients were coached to use reminders (e.g., alarms, pillboxes), to align medication intake with daily routines like meals, and to store medicines in consistent place.

Some interventions were **technology-based interventions**, where nurses incorporated technology to facilitate or deliver the intervention. For instance, compact discs (CDs) were used for Progressive Muscle Relaxation (PMR) practice at home (Jahn et al., 2014), the Nintendo Wii Fit Plus was used for balance training (Hoffman et al., 2017), WeChat was used for remote follow-ups (Li et al., 2022), and electronic Patient-Reported Outcome Measures (PROMs) (Saltbæk et al., 2024) were used for monitoring the symptoms remotely.

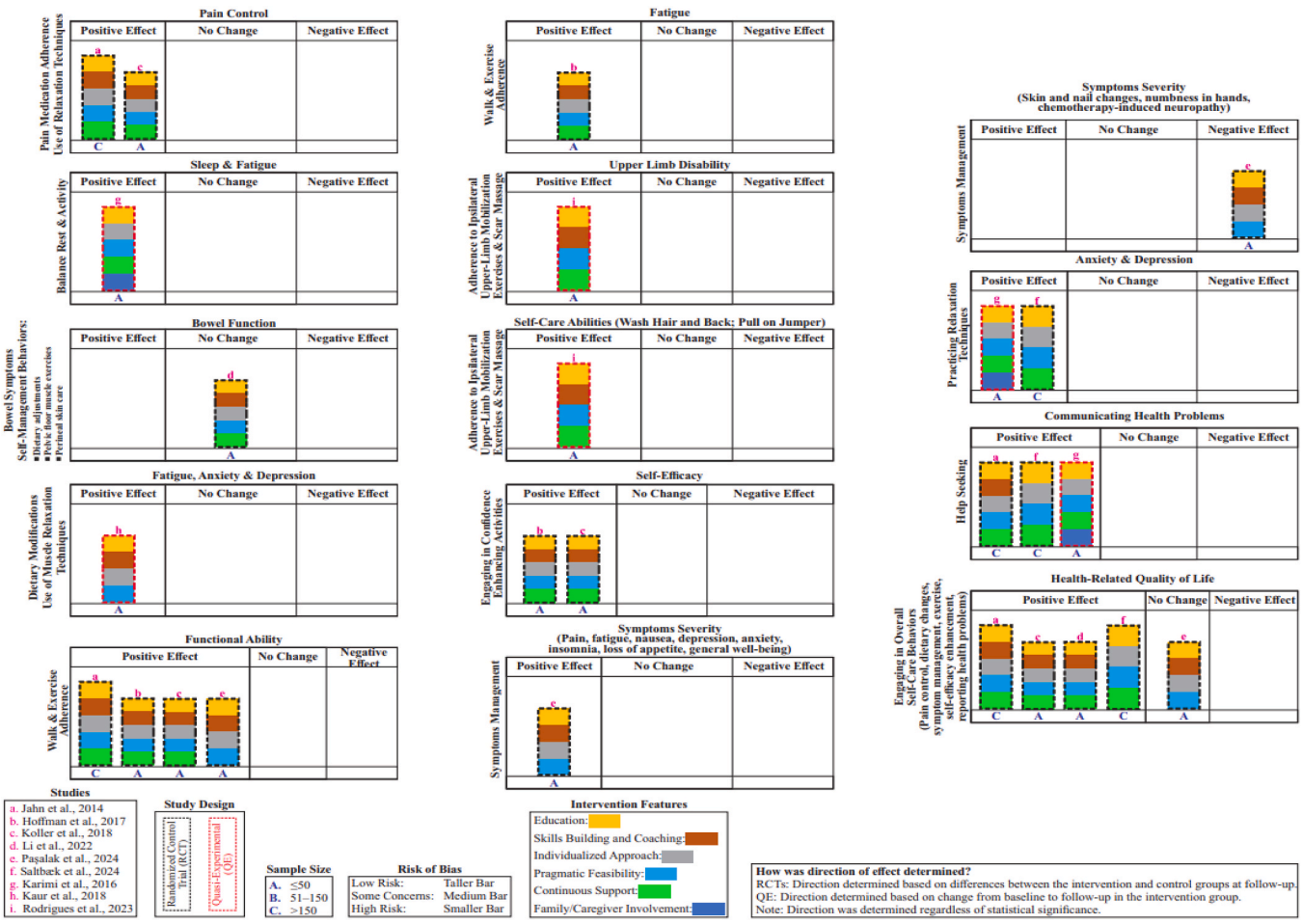


**Fig. 3.** Harvest plot.

Some interventions offered an **individualized approach**, considering the patients' individual needs and preferences (Jahn et al., 2014; Hoffman et al., 2017; Koller et al., 2018; Li et al., 2022; Paşalak et al., 2024; Saltbæk et al., 2024; Karimi et al., 2016; Kaur et al., 2018). Moreover, **continuous support** to reinforce and sustain the required self-care behaviors was another important aspect of nurse-led interventions. Nurses remained in contact with their patients through frequent phone calls, home visits, and digital communication platforms. This continuous contact helped patients in managing their issues promptly and prevented them from developing serious complications.

**Involvement of family members** was incorporated in only one of the nine studies (Karimi et al., 2016). Family members participated along with patients in counseling to support the management of the patients' symptoms and self-care needs.

Lastly, **pragmatic feasibility** was a key consideration in the nurse-led interventions, to ensure practicability and sustainability of the interventions (Jahn et al., 2014; Hoffman et al., 2017; Koller et al., 2018; Li et al., 2022; Paşalak et al., 2024; Saltbæk et al., 2024; Karimi et al., 2016; Kaur et al., 2018; Rodrigues et al., 2023). Nurses assessed patients' individual life situations and their ability levels to ensure that interventions were doable and accessible. They ensured that patients had the necessary resources and access to use the digital tools effectively, and had the capability to use such platforms.

### *4.3. Measurement tools used to assess outcomes*

A diverse range of measurement tools were employed across studies to assess the impact of nurse-led interventions (Table 4). The use of multiple tools highlight the complex nature of cancer and its impact on various aspects of patients' wellbeing. Some tools were used to measure the outcomes related to daily routine self-care behaviors, such as medication adherence, physical activity, and dietary behaviors. For measuring common symptoms such as pain, fatigue, nausea, lymphedema, bowel issues, sexual issues, and psychological concerns, symptom-specific tools were used. Patients also reported their symptoms by recording them in symptom diaries and maintaining the daily log sheets. QoL tools addressed almost all the domains and therefore served as an indicator of the impact of interventions on overall health. Some tools, such as self-efficacy tools, were used to measure the patients' ability and confidence to address emerging health issues.

Some studies directly measured the self-care behaviors by using specific measures, such as the Medication Adherence Scale (Jahn et al., 2014), Bowel Symptoms Self-Management Behaviors Questionnaire (Li et al., 2022), and DASH for functional abilities (Rodrigues et al., 2023). Many studies (Koller et al., 2018; Li et al., 2022; Saltbæk et al., 2024; Karimi et al., 2016) relied on symptom scales or QoL questionnaires, which indirectly captured changes in self-care behaviors that resulted in symptom reduction, improvement in health outcomes, and QoL.

Almost all the studies used reliable and validated tools to measure the outcomes. In terms of psychometric properties, Cronbach's alpha values from the original studies were reported. However, none of the included studies reported whether the tools were adapted or revalidated for their specific context (Jahn et al., 2014; Karimi et al., 2016; Hoffman et al., 2017; Koller et al., 2018; Kaur et al., 2018; Li et al., 2022; Rodrigues et al., 2023; Paşalak et al., 2024; Saltbæk et al., 2024).

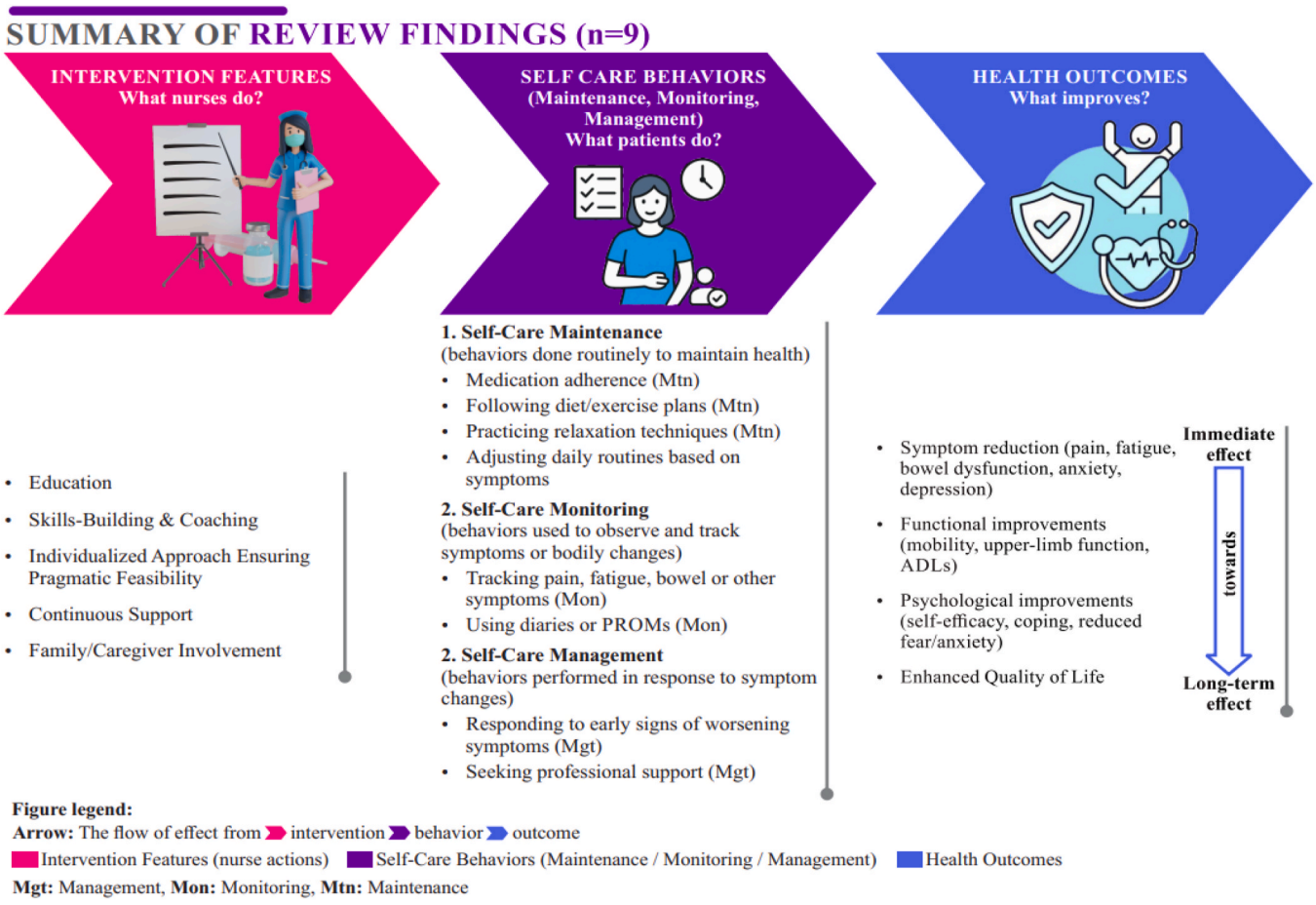


**Fig. 4.** Summary of review findings.

### 4.4. *Effects of nurse-led interventions on self-care behavior outcomes*

We plotted the results from nine studies including both RCTs (n = 6) and QE (n = 3) on a harvest plot (Fig. 3) to synthesize evidence on three key elements: (1) features of nurse-led interventions, the strategies employed by nurses to facilitate these behaviors (2); self-care behaviors, the actions taken by patients; and (3) symptoms/health problems/health outcomes targeted by the self-care behaviors. Self-care behaviors are stated on the y-axis, while symptoms or health problems are stated as headings for each matrix. The direction of effect is shown along the horizontal axis and is categorized into positive effect, no change and negative effect. The effect of interventions was determined based on group differences between intervention and control group at follow-up point for RCTs and change from baseline to follow-up point for QE studies, irrespective of statistical significance. The pink-colored lowercase letters on the top of each bar indicate the study (s) references. Risk of bias is indicated by the height of the bar, the taller bars representing low risk and medium-height bars indicating some concerns. Sample size is shown in blue-colored uppercase letters at the base of each bar. Different colors within the bars indicate features of nurse-led interventions. Study design is indicated via outlines of the bars, the black dotted outlines indicate RCTs and red dotted outlines indicate QE studies.

The distribution of evidence in the harvest plot illustrate that most of the studies have positive effects on outcomes, two studies with no change, and one study with mix of positive and negative effects. Overall, the self-care behaviors relates to three domains: self-care maintenance, monitoring and management (Fig. 3, Tables 2 and 4). For instance, self-care maintenance can be seen through medication adherence, following an exercise schedule, practicing relaxation techniques, and making dietary adjustments as prescribed. Self-care monitoring behaviors include monitoring of symptoms and keeping track of symptoms in diaries. Self-care management behaviors are reflected in responding to symptoms, adjusting daily routines, and help seeking for timely advice. Improvements in all three domains of self-care behaviors lead to improvement in symptoms or health problems (Tables 2 and 4).

Two studies (Jahn et al., 2014; Koller et al., 2018) which employed five features such as education, skills-building and coaching, individualized approach, pragmatic feasibility, and continuous support showed improvement in pain medication adherence and use of relaxation techniques. Both studies also targeted cognitive barriers to pain medication adherence and reported positive effects on pain control.

One study (Karimi et al., 2016), which incorporated four features education, an individualized approach, pragmatic feasibility, continuous support, and family/caregiver involvement showed improvements in balancing rest and activity, as well as positive effects on fatigue reduction and sleep quality.

Dietary modification behaviors led to mixed findings, showing both positive effects and no change across different health outcomes. In Li et al. (2022) study, patients who underwent bowel surgery showed no change in bowel function despite the fact that the researchers incorporated five features of nurse-led interventions that are: education, skills-building and coaching, individualized approach, pragmatic feasibility and continuous support. In this study, patients were required to follow dietary adjustments along with pelvic floor muscle exercises and perineal skin care.

In contrast, Kaur et al. (2018) reported that patients who performed muscle relaxation exercises along with dietary modifications experienced positive effects on fatigue reduction, as well as improvements in anxiety and depression symptoms. In this study, four features of

nurse-led interventions were identified: education, skills-building and coaching, an individualized approach, and pragmatic feasibility.

Exercise and physical activity behaviors usually led to positive effects on functional ability (Jahn et al., 2014; Hoffman et al., 2017; Koller et al., 2018; Pasalak et al., 2024), fatigue (Hoffman et al., 2017), upper-limb function (Rodrigues et al., 2023), and self-care abilities (Rodrigues et al., 2023). In these studies, four to five features of nurse-led interventions were used, and the improvements could be attributed to the synergistic effects of the different intervention features and how they interacted with each other.

Two studies (Hoffman et al., 2017; Koller et al., 2018), which primarily targeted fatigue reduction and pain control, also engaged patients in confidence-enhancing activities. These activities ultimately improved self-efficacy, reduced fatigue and pain, and enhanced functional abilities. As shown in Fig. 3 these two studies incorporated five features of nurse led interventions.

One study (Pasalak et al., 2024) targeted symptom management behaviors and assessed their impact on symptom severity. The study reported mixed effects: improvements were observed in pain, fatigue, nausea, depression, anxiety, insomnia, loss of appetite, and general well-being, whereas negative effects were noted for skin and nail changes and chemotherapy-induced neuropathy, such as numbness in the hands. In this study, four features of nurse-led interventions were implemented expect continuous support and family/caregiver involvement.

Two studies (Karimi et al., 2016; Saltbæk et al., 2024) reported better adherence to relaxation techniques, which had positive effects on psychological outcomes such as anxiety and depression. In these studies, five to six features of nurse-led interventions were incorporated, as identified in the present review.

Studies (Jahn et al., 2014; Saltbæk et al., 2024; Karimi et al., 2016) in which patients demonstrated help-seeking behaviors showed improvements in the timely communication of health problems. In all the three studies, various features of nurse-led interventions were observed.

Four studies (Jahn et al., 2014; Koller et al., 2018; Li et al., 2022; Saltbæk et al., 2024), in which improvements in Health-Related Quality of Life (HRQoL) were measured, also reported better adherence to pain medications, dietary adjustments, symptom monitoring and management, exercise, confidence-enhancing activities, and timely reporting of health issues. In contrast, one study (Pasalak et al., 2024) showed no change, which may have been attributed to other factors such as treatment and disease recovery pattern.

### 4.5. *Summary of review findings*

Fig. 4 summarizes the review findings by illustrating how different features of nurse-led interventions support patients' self-care behaviors and which ultimately improve patients' overall health outcomes. It shows that nurses support patients' self-care behaviors through education, skills-building, individualized approach ensuring pragmatic feasibility, continuous support, and involvement of family or caregivers. These features in intervention help the patients to engage in required self-care behaviors such as maintaining their health through medication adherence and lifestyle adjustments; monitoring symptoms using tracking tools; and managing symptoms by responding to changes and seeking timely advice from health care professionals. As a result of adopting these self-care behaviors, patients experience improvements in health outcomes such as reduced symptoms, better functional abilities, enhanced psychological well-being, and overall improved QoL.

## 5. Discussion

This review provides a comprehensive synthesis of how nurse-led interventions support wide range of self-care behaviors such as: medication adherence, physical activity, dietary modifications, symptoms monitoring and symptoms management among patients living with cancer, an area previously not well explored in the existing literature. Previous reviews examined the impact of nurse-led interventions on either symptoms management or self-management however they did not clearly identify that which specific self-care behaviors contributed to improvement in symptoms or overall health outcomes. This synthesis further enhances our understanding of the specific self-care behavior actions that patients with cancer need to perform to manage their disease and treatment-related side effects.

The interventions varied in terms of their design, content, delivery methods, and duration. In the current review, these differences limited the possibility of performing a meta-analysis. As highlighted in previous study that such variations also have implications for the development of standardized clinical guidelines and evidence-based practices (Lawlor et al., 2025). Despite this diversity, the present review made an effort to synthesize the fragmented information on self-care behaviors across the three domains that are: maintenance, monitoring, and management as described in Riegel's self-care framework (Riegel et al., 2012, 2018). This review provides insight for nurses to develop and deliver future nurse-led interventions which are grounded in theoretical framework. This review also supports Godfrey and colleagues' (2010) assertion that incorporating theoretical frameworks into the design and delivery of interventions can reduce fragmented evidence and enhance transparency in the interpretation of findings.

In all nine studies, teaching and education comprised the core feature of almost all interventions. Previous studies also identified patient education as a prerequisite for effective decision-making in disease trajectory (Riegel et al., 2012; Tan et al., 2019). Similarly, skills-building and motivational coaching also emerged as an important aspects of nurse-led interventions to support the self-care behaviors of patients with cancer. Skills training equip patients with practical abilities, while motivational coaching fosters confidence to independently perform the learned skills. These findings are concurrent with other researchers who mentioned that skills-building combined with motivational coaching serve as key facilitators in transforming knowledge into action (Lorig et al., 2001; Bonetti et al., 2022). Our review also suggest that combining skills-building with motivational coaching can enhance patients' confidence and engagement in self-care behaviors which resulted in improvement of overall health outcomes.

Several studies in this review used an individualized approach to ensure the pragmatic feasibility of interventions across diverse patient populations. An individualized approach in interventions not only enhances patients' awareness of their health problems but also fosters a sense of accountability in taking proactive actions to improve their health outcomes (Cengiz and Korkmaz, 2023). A systematic review on patients with diabetes which is also a long-term health problem, has emphasized that addressing individual needs improves patient engagement and overall health outcomes (Asmat et al., 2022). The present review extends this evidence by showing how personalization is operationalized in cancer interventions. Personalization is not only limited to delivery of education but may also be reflected through adjusting the time and mode of intervention considering the patients' circumstances. For instance, some interventions were even delivered during chemotherapy sessions, taking into account patients' time constraints and the need for addressing the anticipated post-chemotherapy challenges.

The synthesis of evidence indicate that continuous support through different methods of follow-ups were found to be an important aspect of the intervention that is useful for the sustainability of self-care behaviors. These findings are in line with previous study which has shown that regular monitoring and follow-ups play an important role in the timely identification and management of emerging complications in patients with long-term health problems (Zhang et al., 2025). The use of continued support is not just about using different follow-up methods, but also depends upon the frequency, consistency and was that helpful or not. Lack of consideration for these factors may limit the effectiveness of interventions. This finding provides new insight to nurses for being mindful about follow-up methods and strategies in designing of future nurse-led interventions.

Similarly, many studies included digital tools in interventions, but very few evaluated whether patients had the digital literacy or access to use these tools effectively. Incorporating digital features in interventions may help with remote monitoring and early detection of patients' symptoms, especially for those living in areas with limited access to healthcare (Basch et al., 2016). As review, mostly included those studies which were conducted in high income countries. Equity is an important consideration when applying these findings to low- and middle-income countries. Device access, cost, and patients' digital literacy must be considered when integrating such technologies into interventions (Maita et al., 2024).

Interestingly, only one study involved patients' family members or caregivers as an intervention strategy, highlighting an important but unexamined area in earlier studies. Cancer is a complex health problem, and patients often require support to manage their health until they can perform self-care behaviors independently (Murphy et al., 2023). There could be several reasons behind this particular finding which may have limited the opportunity of family to be involved in interventions. Firstly, interventions may have prioritized the patients' autonomy during their illness trajectory and related decisions. Secondly, methodological constraints such as: concerns about increasing intervention complexity, challenges in recruiting family members, or focusing only on patients in interventions. Thirdly, review could have captured only those contexts where family involvement is not viewed as necessary or where self-care behaviors are viewed as totally individual matters. This may also be explained by national and cultural differences that how families are involved in supporting the self-care behaviors of patients living with long-term health problems. A study conducted in Uganda reported that family members or caregivers provide essential support to patients with long-term health problems, particularly in the context of low- and middle-income countries where healthcare systems are less developed (Najjuka et al., 2023). Cultural context is an important factor when interpreting these findings. Cultural differences and varying family structures may limit the availability of family members or caregivers, raising concerns about the feasibility of involving them in interventions.

Several studies in current review incorporated patient counseling and relaxation techniques to address the cancer-associated emotional and psychological burden. Counseling and relaxation techniques enhance patients' confidence, strength, and engagement in their self-care, findings are in line with previous review (Warth et al., 2020). Notably, previous studies have not examined how addressing emotional needs could influence patients' ability to adopt and engage in self-care behaviors. By highlighting this connection, the current review provides new insight for future interventions regarding the importance of psychological health aspect in promoting self-care behaviors.

As expected, most of the studies in this review addressed pain management; however, it was enlightening to see that the interventions also targeted the cognitive barriers to pain management. Addressing these barriers is necessary for improving adherence to pain medicine and achieving the desired therapeutic effects. As suggested by Timmerman et al. (2016), strategies like education on pain medications, correcting myths about side effects, and clarifying dosing and schedules could improve pain medication adherence. The current review builds on previous research and emphasizes that addressing misconceptions related to fear of addiction, as well as correct timing and dosage, may improve adherence to pain medication.

The current review further revealed that most studies used tools or measures primarily to assess the impact of interventions on symptom improvement or health outcomes, while direct measures of self-care behaviors were lacking. Studies relying on indirect outcomes cannot definitively demonstrate that the interventions improved self-care behaviors; observed changes may be mediated by other factors. Direct measures are needed to establish a clearer link between intervention features and behavior change. Future studies should incorporate direct measurement of self-care behaviors besides health outcomes to clarify how these behaviors contribute to improvements in symptoms or overall health outcomes. None of the studies reported whether the instruments were adapted or revalidated for their specific clinical or cultural contexts. The lack of adaptation and revalidation of some tools may affect their cultural and contextual relevance, and the current review emphasizes the consideration of this aspect for future interventional studies (Beaton et al., 2000). The transparent reporting of such processes enhances the validity and generalizability of findings (Sousa and Rojjanasrirat, 2011; Tsang et al., 2017).

The findings of this review also suggest that the interventions with multiple features and symptom- or problem-focused interventions seemed most effective. The use of multiple strategies reinforces self-care behaviors and enhances patient engagement, while interventions targeting specific symptoms or behaviors yield better results by addressing patients' unique needs and challenges (Lei et al., 2023; Kelly et al., 2022a,b).

### 5.1. *Review limitations and strengths*

The search was comprehensive, focusing on four international scientific databases in health sciences. Relying solely on scientific databases and excluding grey literature, along with limiting the search to English-language studies, may have risked overlooking relevant research. However, the search produced a rich variety of hits on the topic. The robustness of the review lies in its systematic and reliable methodology. An information specialist from the university library validated the search string. Two independent doctoral researchers (SB, SY) screened the studies using Rayyan software by ensuring a blind and rigorous screening process. Discrepancies were addressed through discussion until consensus was achieved. The included studies generally remained at a low to moderate risk of bias, which supports confidence in the findings. However, representation of studies from low-income countries remained limited, as the challenges of those contexts are not yet fully understood. To mitigate reporting bias, a detailed Excel sheet was formulated for careful data extraction. The diverse and heterogeneous characteristics of the interventions, along with the varied outcomes, posed a hindrance in the meta-analysis. A key strength of this review is the mapping of self-care behaviors into the three domains of self-care maintenance, monitoring, and management using Riegel's theoretical framework. The review also revealed that all the identified self-care behaviors are aligned with these domains, highlighting the usefulness of Riegel's framework for identifying and classifying self-care behaviors.

## 6. Recommendations for future research

Future research may focus on several key areas identified in this review. By addressing variability in interventions' designs, future interventions could be delivered in a standardized and robust manner, while still allowing adaptation to individual patients' needs according to their cancer trajectories. As technological tools have shown promising effects in enhancing patient engagement, future research could investigate their impacts by integrating them into routine care. Studies could focus on creating and testing personalized approaches to better address the unique needs of individual patients. Future research should provide information on the cultural adaptation and validation of measurement tools for the target population. Family or caregivers should be involved in future interventions to support patients in their self-care until they achieve independence.

## 7. Implications for nursing practice

The findings from this review offer several important implications for nursing practice. Incorporating teaching and educational components into nurse-led interventions may improve patients' understanding of their health problem and treatment. Educational aspects could support patients in more informed decision-making and in turn could

## Practice Box: Key Features to Include in Nurse-Led Self-Care Behavior Interventions in Oncology Nursing

- **Education + Skills-Building:** Teach self-care behaviors, train on symptom monitoring, record keeping in diaries, relaxation exercises, and coping strategies.
- **Consistent Follow-Up:** Reinforce self-care behaviors through in-person, phone, or digital check-ins.
- **Screening for Cognitive Barriers:** Identify beliefs, myths or fears that may limit self-care engagement.
- **Family/Caregiver Involvement:** Include support where culturally appropriate.
- **Digital Access and Literacy Check:** Ensure patients can use telehealth, apps, or digital tools effectively.
- **Goal:** Promote self-care behaviors and improve patients' health outcomes and symptoms.

improve patients' self-care behaviors. Addressing cognitive barriers related to pain management, such as fears of addiction, misconceptions about medication, or reluctance to report pain, could enhance pain medication adherence and overall symptom control. Nurse-led interventions could also benefit from the inclusion of multiple components and by focusing on specific symptoms of the patients.

Additionally, providing training to family caregivers may strengthen the support system for patients and could enhance patients' self-care practices at home. Consistent follow-ups, either through in-person or remote, may help patients in identifying and overcoming barriers to self-care. Integrating digital tools for symptom tracking could support patients through timely communication with their healthcare team. Addressing the psychological dimensions of care, such as anxiety, emotional distress, and fear of recurrence, within nurse-led interventions may positively influence self-care behaviors. Employing a structured theoretical framework while designing and evaluating interventions could provide a systematic approach to addressing patients' problems.

## 8. Conclusion

Overall, the review findings indicates that the nurse-led interventions which use multiple strategies are effective in improving patients' self-care behaviors. Variability in intervention designs and outcome measures limits comparability across studies and the feasibility of conducting a meta-analysis. This limitation highlights the need for standardization of intervention designs and outcome measures in future studies. Teaching and education, skills-building and motivational coaching, individualized approach ensuring pragmatic feasibility, continuous support, and family involvement are found to be the core features of nurse-led interventions that promote self-care behaviors. Education, skills-building, and continuous support in combination produce more positive effects on outcomes. Interventions also show positive effects when they focus on a specific aspect or symptom. Notably, the minimal involvement of family or caregivers highlight a critical gap, especially in settings where family support is essential. Future interventions should prioritize standardization, integration of family support, and multi-feature approaches to enhance impact of nurse-led interventions on patients' self-care behaviors and health outcomes.

## Language and Generative AI support

The manuscript was professionally edited for language by a native English speaker, AI support was used to assist with minor language editing.

## CRediT authorship contribution statement

**S. Batool:** Writing – review & editing, Writing – original draft, Software, Resources, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **R. Suhonen:** Writing – review & editing, Supervision, Methodology, Conceptualization. **R. Gul:** Writing – review & editing, Supervision, Methodology, Conceptualization. **S. Yasmeen:** Writing – review & editing, Software, Resources, Investigation. **M. Stolt:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

## Data availability statement

No new data were created or analyzed in this study. All data used are from previously published sources, which are cited in the manuscript.

## Funding

This work was supported by the EDUFI Fellowship (Finnish National Agency for Education) and by support for the language editing fee.

## Declaration of competing interest

All authors declare no conflicts of interest.

## Acknowledgements

I would like to acknowledge Librarian, from University of Turku Library, for her invaluable assistance in finalizing the search string. I also sincerely appreciate Leigh Ann Lindholm for her expert support in language editing of the manuscript.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejon.2026.103107.

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