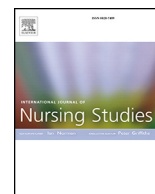




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Nursing interventions for pediatric patients with cancer and their families: A scoping review

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ABSTRACT

Background: Clinical nursing care is an essential element in pediatric oncology. The body of research interventions targeting pediatric oncology patients and their families has grown in recent years. However, no reviews are currently available on nursing interventions for pediatric oncology.

Aim: The aim was to develop a comprehensive overview of the available nursing interventions for pediatric oncology patients and their families, outline the characteristics of the interventions, and identify any knowledge gaps.

Methods: This review was conducted in accordance with the JBI guidelines for scoping reviews. Citations were retrieved from the following databases: Scopus, PubMed, CINAHL, PsycINFO, and Embase. The following inclusion criteria were applied: peer-reviewed studies written in English, Danish, Norwegian, or Swedish from 2000 onward and reporting on pediatric patients with cancer and/or family members of a pediatric patient with cancer who received non-pharmacological and non-procedural nursing interventions provided by a pediatric oncology hospital service. Eligible studies were screened by title and abstract, and in full text by two independent reviewers. Critical appraisal was achieved using the Mixed Methods Appraisal Tool.

Findings: Among 2762 references, 26 studies met the inclusions criteria, comprising 25 unique nursing interventions. 89 % had been published from 2013 onward, reflecting the rapid changes occurring in pediatric oncology treatment. 36 % were qualitative, 58 % were quantitative and 8 % employed mixed methods. The studies were characterized by considerable diversity in terms of intervention content, components, timing of delivery, and delivery mode. 60 % of the interventions were targeted parents among whom mothers were highly overrepresented (75 %). 16 % adopted a family-centered focus.

Conclusion: This review contributes to building a more comprehensive understanding of the evidence base within pediatric oncology nursing research. This field is evolving and holds the potential to support families with childhood cancer across various phases of their treatment trajectory. However, a clear need exists to develop and test interventions with a genuinely family-centered focus, targeting both patients and family members. A considerable gap exists in reporting of the intervention development process and intervention characteristics. Improving the reporting of intervention development is needed to enhance research quality and facilitate subsequent adaptation or upscaling of interventions for use in other populations and contexts.

Tweetable abstract: Nursing interventions can support families with childhood cancer but future intervention studies need to enhance transparency in reporting @IJNSjournal

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What is already known

- Clinical nursing care is an essential element in pediatric oncology.
- The increasing demand for quality nursing care in this continually evolving clinical field of pediatric oncology calls for evidence-based nursing interventions.
- No review of nursing interventions for pediatric patients with cancer and their families is currently available.

What this paper adds

- This scoping review contributes to establishing a better understanding of the evidence base in the field of pediatric oncology nursing research.
- This scoping review found that nursing interventions hold a potential to support families with childhood cancer across the cancer continuum.
- Improving the reporting of intervention development is necessary to enhance research quality and facilitate subsequent adaptation or upscaling of nursing interventions.

1. Background

Advancements in pediatric cancer diagnostics and treatment protocols have yielded markedly increased survival rates in recent decades. Since the mid-1970s, the ≥ 5 -year survival rate has increased from 58 % to more than 80 % in high-income countries (Steliarova-Foucher et al., 2017; Lam et al., 2019), leading to a rising number of children and families living through and beyond a childhood cancer trajectory. As cancer treatment continues to evolve, the attention devoted to acute and late side effects also increases. A major challenge is to minimize the damages caused by toxicity-inducing treatments and reduce long-term side effects (Mody et al., 2008; Withycombe et al., 2019). Patients with pediatric cancer experience excessive negative physical, emotional, and social consequences due to cancer and cancer treatment (Mooney-Doyle et al., 2020; Darcy et al., 2016). Furthermore, the increasingly intensive treatment regimens with multiple, often unpredictable and prolonged hospitalizations cause families to live a burdensome and disrupted life, which profoundly affects the functioning of all family members (Erker et al., 2018; Van Schoors et al., 2017). Siblings in families with childhood cancer are particularly vulnerable as they must adapt to multiple changes, including new family roles and unexpected family disruptions with limited parental support (Long et al., 2018). Parents are often the patients' primary support as they face demanding treatment procedures, and parental burnout is reported to occur already within 6 months of the cancer diagnosis (Koumarianou et al., 2021). Even several years after a complete remission, feelings of vulnerability persist among many family members, showing how profoundly a pediatric cancer treatment course affects family life (Peikert et al., 2018; Inhestern et al., 2022). These negative short- and long-term impacts of childhood cancer on patients and family members receive increasing attention, and the importance of comprehensive treatment and care was amply illustrated in a wide range of previous studies (Wiener et al., 2020; Steele et al., 2015; Luo et al., 2021). Even so, a recent umbrella review reported significant shortcomings in oncology care. Among both adult and pediatric cancer populations, the authors found unmet needs across a wide range of supportive care domains (Paterson et al., 2023).

In the context of pediatric oncology, a collaborative multidisciplinary team is essential in providing quality care (Kazak and Noll, 2015). Nurses play a central role in these teams (Gunter and Duke, 2018). They are the healthcare professionals who most frequently come into contact with patients and families (Landier et al., 2023). In nurse-patient-family interactions, nurses deal with highly complex health issues on a daily basis and serve as a crucial resource for patients and family members who are mentally and physically overwhelmed (Hopia and Heino-Tolonen, 2019). Several studies found that nurses were particularly well positioned to identify and manage the support needs of this population (Kiernan et al., 2010; McHaro et al., 2022). The increasing demand for quality nursing care in this continually evolving clinical field, which requires increasingly complex treatment protocols, calls for evidence-based nursing interventions. However, existing psycho-oncology nursing research has been predominantly explorative. A shift toward translating research results into clinical practice is necessary to improve the quality of care for pediatric patients and families (Enskar et al., 2015; Zupanec et al., 2023).

Several reviews exist on psychosocial interventions for patients with childhood cancer and their families (Meyler et al., 2010; Steele et al., 2015; Koumarianou et al., 2021). However, these previous reviews mainly focused on interventions provided by psychologists (e.g., individual and/or group-based cognitive behavioral therapy). Such interventions are important. However, the provision of nursing in the pediatric oncology setting is quite distinct from interventions focusing on psychology, and the increasing demand for evidence-based nursing interventions in pediatric oncology is evident (Weinstein and Henrich, 2013). Both children and families affected by childhood cancer emphasized the importance of nursing support and care during their cancer trajectory (McHaro et al., 2022). In recent years, the body of nursing interventions has grown, with a great variety of designs and definitions (e.g., family-level interventions, parent educational programs, support models, and communication tools). The knowledge and experiences of the patients and families involved in these nursing interventions provide important insights that may inform the planning and implementation of future pediatric oncology interventions (Jibb et al., 2018). Furthermore, existing interventions that may be adapted from other clinical contexts are a key resource in the development of future interventions. Considering the adjustments and refinements suggested by previous interventionists may provide useful information and facilitate the optimization of future interventions (Bleijenberg et al., 2018). Identifying the currently available nursing interventions is an important first step in establishing an evidence base. Another important step is determining any research gaps that need to be addressed. A preliminary search of the Cochrane Database of Systematic Reviews, *JB* Evidence Synthesis, MEDLINE, CINAHL, Scopus, and PROSPERO was conducted between February 1 and March 8, 2022. The search identified no current or upcoming systematic or scoping reviews on the topic. Given the important role of nurses, building a comprehensive evidence-based understanding of currently available nursing interventions in pediatric oncology is warranted.

The objective of this scoping review was to identify and map available nursing interventions for pediatric patients with cancer and/or their family members. We aimed to provide a comprehensive overview of the available nursing interventions and to outline the characteristics of the interventions.

1.1. Research question

- What are the available nursing interventions for pediatric patients with cancer and/or their family members provided by pediatric oncology hospital services?
- What are the characteristics of the patients and family members who were included in the nursing interventions?
- What are the main components, timing, and delivery modes of the nursing interventions?
- What are the main findings from the perspective of the pediatric patients and/or their family members relating to the interventions?
- What suggestions are highlighted for further development of interventions?

2. Methods

Scoping reviews are a useful methodology in emerging research areas and when the aim is to map the breath of available evidence on a given topic (Pollock et al., 2021). As no review of nursing interventions was previously conducted in the field of pediatric oncology (Tricco et al., 2016b), we adopted the *JB* scoping review methodology (Peters et al., 2020) and used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines (Tricco et al., 2018). In line with the *JB* guidelines, a protocol was developed ahead of this scoping review (Rørbech et al., 2023).

2.1. Inclusion and exclusion criteria

Peer-reviewed original studies applying qualitative, quantitative and mixed method designs were considered for inclusion. Studies eligible for inclusion were nursing interventions for pediatric oncology patients and/or their family members provided by a pediatric oncology hospital service, in hospitals, outpatient clinics, and other contexts such as the home of the patient and/or family. No geographical restrictions were applied. A broad spectrum of nursing interventions was considered (e.g., family-level interventions, care activities, educational programs, support models, and communication tools). Inspired by Wright and Bell's proposed definition of nursing interventions, we included interventions only when a nurse was accountable for delivering or providing the intervention and when the intervention occurred in the context of a nurse–patient relationship (Robinson and Wright, 1995). No restrictions on nurses' educational level were applied. Studies with interventions aimed primarily at nurses (e.g., through education without any nurse–patient interaction) were excluded. Pharmacological and procedure-related interventions were excluded. No restrictions were applied with respect to cancer type or age. Cohorts of pediatric patients with cancer in survivorship and end-of-life/palliative care were excluded. This was done to ensure a clear and manageable scope, while providing recommendations specific to the active treatment phase. All family members were included. Thus, no restrictions were applied on the recipient of the nursing intervention; studies were included regardless of whether the intervention targeted a pediatric patient, a single family member (e.g., a sibling), both parents, or the entire family. Publications in English, Danish, Norwegian, or Swedish were considered as these languages are read and understood by the research team. To capture current oncology treatments and healthcare patterns, studies published from 2000 onward were included.

2.2. Search strategy

The study employed a three-staged search strategy (Peters et al., 2020). First, an initial comprehensive literature search was conducted of MEDLINE, CINAHL, and Scopus to identify relevant articles on the topic. Second, hand searches were made to screen for frequently used keywords in existing reviews on psychosocial interventions (Steele et al., 2015; Meyler et al., 2010; Vasilopoulou et al., 2022; Pai et al., 2007; Koumariou et al., 2021; Coughtrey et al., 2018). The text words contained in the titles and abstracts of relevant articles and the index terms describing the articles were used to develop a full search strategy containing the PCC elements (Population, Concept and Context) (see Table 1) that aligned with the objective and research questions (Peters et al., 2020). Third, the result was a systematic search block strategy using the identified keywords and combining them using the Boolean operators AND/OR. The search strategy was developed and qualified in consultation with an academic librarian.

The strategy, including all identified keywords and index terms, was adapted for use in each included database: Scopus, CINAHL (EBSCO), PubMed, PsycINFO (ProQuest), and Embase. The search was conducted in May 2022 and updated in August 2023. Weekly alerts were set up in all the selected databases to inform the authors of any new publications meeting the search criteria during the review process.

Table 1
The PPC mnemonic (Population, Phenomenon of interest, Context).

PPC	Inclusion	Exclusion
Population	Pediatric patients with any cancer type and/or family members to a pediatric patient with cancer	Palliative Survivor Adult cancer patients
Phenomenon of interest	Interventions delivered by nurses	Procedural Pharmacological
Context	Provided by a hospital service (hospital units, outpatient clinics, home)	Provided by other than a hospital services

Finally, to identify more sources, additional citations were tracked manually in the reference lists of all included studies in a forward and backward citation search. The identified studies were assessed for eligibility by title and abstract (Hirt et al., 2023). This included any systematic reviews that met the inclusion criteria. Due to time limitations, the authors of the papers were not contacted to request missing and supplementary data. The final search strategy for PubMed is summarized in Supplementary material Table 1. The search strategies for the other databases are available from the authors on request.

2.3. Study selection process, source selection, and screening process

All the identified studies were collated and uploaded into the Systematic Review Accelerator software (Accelerator) and duplicates were removed. For screening, the results were imported into the online software Covidence (Covidence, 2021). Following a pilot test comprising a sample of 50 studies, titles and abstracts were screened for compliance with the inclusion criteria by two independent reviewers. Next, two reviewers assessed in detail the full text of the selected studies to finally establish compliance with the inclusion criteria. A PRISMA flow chart detailing the selection process is presented in Fig. 1. Any disagreements arising between the reviewers at each stage of the study selection process were resolved through discussion.

2.4. Quality appraisal

Poor reporting of the content and characteristics of interventions resulted in a considerable amount of missing data. Therefore, we choose to critically appraise the evidence of all studies using the validated Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). The MMAT is designed to critically appraise the most common types of study methodologies such as quantitative, qualitative and mixed-methods studies. Because the studies included in this scoping review had adopted different study designs, such as qualitative, quantitative, and mixed methods, the MMAT tool was relevant for our purpose. All studies were assessed by two independent reviewers (a research assistant and the first author). Disagreements were solved through discussion with a third reviewer (last author). Overall, the quality of the qualitative studies was good. The overall quality of the quantitative studies was moderate, and compromised by small sample sizes, no comparison groups, and a lack of information on intervention exposure. See Supplementary material Table 2 for a quality appraisal of all included studies.

2.5. Data extraction process

Data from the included studies were extracted by two independent reviewers (first and last author) using a data extraction tool developed by the reviewers (Supplementary material Table 3). The extraction tool was inspired by the Template for Intervention Description and Replication in Healthcare (Hoffmann et al., 2014). The extraction tool was developed by the first author, circulated within the research team, and refined in an iterative process (Pollock et al., 2023). The extracted data considered specific details about the intervention components, participants, timing, intervention duration, stage at which the intervention was applied in the cancer trajectory, context (e.g., out-patient clinic, hospital), study methods, and key findings relevant to the review questions.

We piloted the data extraction tool on three randomly selected types of studies with different evidence types (one quantitative, one qualitative, and one mixed-methods study). After piloting, the extraction sheet was incorporated into Covidence and the data extraction and consensus process was completed independently by two reviewers. Disagreements between the two authors were resolved through discussion.

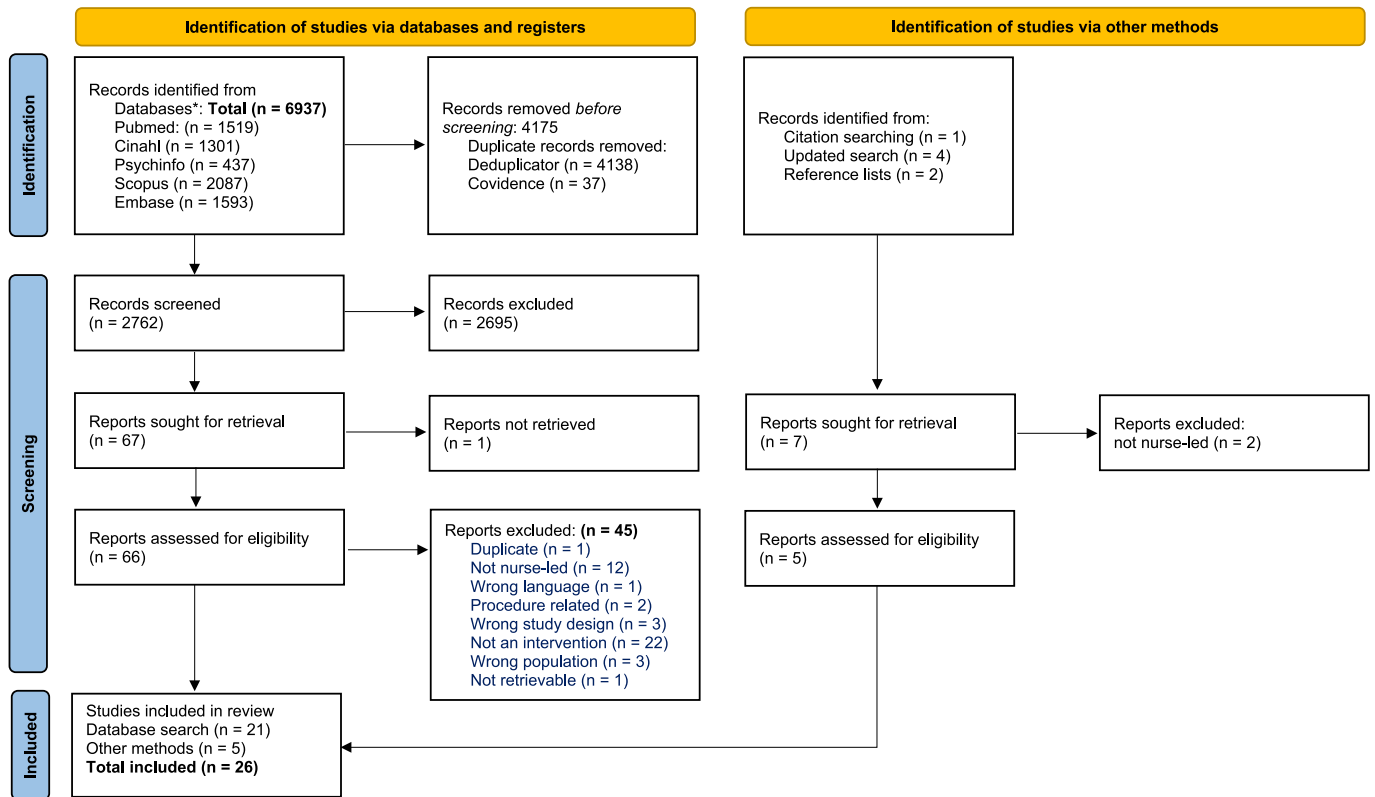


Fig. 1. PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: <https://doi.org/10.1136/bmj.n71>. For more information, visit: <http://www.prisma-statement.org/>.

2.6. Data and result synthesis

The extracted data were summarized and charted in order to obtain frequencies of the following variables: year of publication, country of origin, study design, population characteristics (number of patients, age, gender, diagnosis, number of family members), and target population of the interventions. The following intervention characteristics were recorded: theoretical framework used; duration; timing; delivery mode; information about the nurses delivering the intervention; intervention type; components; main findings from participants receiving the intervention; and further recommendations, refinements or developments of the interventions. Knowledge gaps were identified and summarized.

3. Results

A total of 2762 records were retrieved, of which 2695 were excluded following title and abstract screening. The main reasons for exclusion were that the studies adopted either a palliative or a survivorship focus. Full-text screening excluded another 45 studies, leaving 26 studies, of which 25 were unique nursing interventions. Svavarsdottir and Sigurdardottir (2006) and Erla Kolbrún Svavarsdottir (2005) reported two studies based on the same intervention. Ringné et al. (2023), Ringné et al. (2021), and Ringné et al. (2015) also reported very similar interventions in three papers. However, all the studies by Ringné et al. were reported using different designs, covering different time slots and based on different sample sizes, and were therefore all included. Thus, the results presented below are based on the 25 nursing interventions identified and a summary of included studies is presented in Table 2.

3.1. Year and country

The included studies were published from 2005 to 2023 with 88.5 % ($n = 23$) being published as from 2013. Geographically, 25 % ($n = 7$) of

the interventions were conducted in the US; 20 % ($n = 5$) in Sweden; and 8 % ($n = 2$) in Denmark, Australia, Iceland, and China, respectively. Finally, 4 % ($n = 1$) were conducted in Iran, South Korea, Brazil, Canada, and Chile.

3.2. Study designs and characteristics

36 % ($n = 9$) were qualitative, 60 % ($n = 15$) were quantitative, and 4 % ($n = 1$) were mixed-methods studies.

78 % ($n = 7$) of the qualitative studies employed semi-structured interviews as a data collection method. 33 % ($n = 3$) combined various methods as follows: Landon et al. (2019) used group discussion and written email responses as data material. West et al. (2015) used videos, letters, and interviews. Larsen et al. (2013) used a combination of participant observations and semi-structured interviews.

27 % ($n = 4$) of the quantitative studies were randomized controlled trials (Park et al., 2023; Ringné et al., 2023; Yu et al., 2014; Haase et al., 2022), 27 % ($n = 4$) adopted a quasi-experimental design (Svavarsdottir and Sigurdardottir, 2006, 2013; Hooke et al., 2019; Hatami and Hojjati, 2019), and 46 % ($n = 7$) employed a range of other designs.

3.3. Characteristics of the patients and family members included in the nursing interventions

3.3.1. Patient population

3.3.1.1. *Number.* A total of 1213 pediatric patients were included in 20 interventions. Five studies failed to report any data on patients. These studies targeted parents or siblings only (Landon et al., 2019; Trondle et al., 2021; Wilson Smith et al., 2018; Jenholt Nolbris and Ahlström, 2014; Hatami and Hojjati, 2019). The number of pediatric patients ranged from 3 to 283.

Table 2
Summary of included studies. NA = not available, TF = theoretical framework.

Author(s) (year) Country	Study design	Number of participants	Diagnosis Age of patients	Type and main components Context and delivery	Aim of intervention	Timing in cancer trajectory Duration	Key findings Theoretical framework
Bensink et al. (2008) Australia	Quantitative Non-randomized pilot study	Patients (n = 8) Family: NA	Leukemia (n = 2) Sarcoma (n = 3) Other (n = 3) Age: 2–18 years	Discharge education: Video telephone discharge package Home Video technology	NA	Timing: Newly diagnosed: Before first hospital discharge post diagnosis Duration: Over a three-month period there were 20 video telephone links	Providing video telephone-based discharge support appeared feasible. TF: NA
De la Maza et al. (2020) Chile	Quantitative Non-randomized experimental study	Patients (n = 102) Mother (n = 92) Fathers (n = 3) Others (n = 7)	Leukemia (n = 59) Lymphoma (n = 12) Solid tumor (n = 18) Other (n = 13) Age: 7 years (mean)	Informational: Individual sessions included topics related with cancer pathophysiology, diagnosis and treatment of cancer Context: NA Face to face	NA	Timing: Newly diagnosed: 15–90 days post diagnosis Duration: 4 h of education, with sessions on 3 consecutive days	A structured educational program was associated with a higher level of knowledge among caregivers of children with a recent cancer as well as improved clinical outcomes. TF: NA
Duffy et al. (2021) USA	Quantitative Nonregulated, quality improvement project	Patients (n = 69) Parents (n = 47)	Diagnosis: NA Age: NA	Discharge education: Standardized educational checklist including: Diagnosis, resources/accessing care, side effect management, basic health practices/preventing infection, and home medications Hospital Face to face	To support safely care for the child at home following the first hospital discharge.	Timing: Newly diagnosed: Before first discharge post diagnosis Duration: NA	Implementation of the checklist was feasible, with moderate fidelity to checklist topics taught across the two sites. TF: The Iowa model of Evidence Based Practice
Ellis et al. (2013) Australia	Qualitative	Patients (n = 3) Mothers (n = 7) Fathers (n = 1) HCP (n = 5)	Diagnosis: NA Age: 5–12 years	Psychosocial: Videoconferencing to connect the patient to their classrooms Hospital or home Online	To keep children better connected to their home school and peers during treatment and rehabilitation and to assist with school reintegration	Timing: NA Duration: Session lasting up to an hour each, frequency ranged from less than five times in total to almost daily for a period of several months	Videoconferencing technologies may provide an important tool to connect childhood cancer patients to their classrooms. Primary benefits of these programs were found to be psychosocial rather than academic. TF: NA
Haase et al. (2022) USA	Quantitative Randomized controlled trial (Qualitative evaluation)	Patients (n = 110) Mothers (n = 95) Fathers (n = 15)	NA Age: 11–24 years	Psychosocial: 1. Therapeutic music video for AYA. 2. Parents received tailored sessions focused on self-care and fostering parent-AYA communicationHospital and out- patient clinic Face to face	To reduce parent distress and improve communication during high-risk cancer treatment	Timing: NA Duration: 5 × 60 min sessions within 6–8 weeks	Adolescent and young adult groups did not differ significantly for any of the outcomes. For parents, the “self-care and communication” intervention was successful in raising self-awareness and parent confidence in the short term. TF: RIM and Robb’s Contextual Support Model
Hanghøj et al. (2022) Denmark	Qualitative evaluation design	Patients (n = 10) Mothers (n = 11) Fathers (n = 2)	Leukemia (n = 2) Lymphoma (n = 2) Solid tumor (n = 3) CNS (n = 2) Other (n = 1) Age: 15.4 (mean)	Psychosocial: 5 components based on 10 domains: 1. Introduction section with both parents and young patient 2. A split visit consultation 3. MDT conference creating individ- ual tailored support package 4. Split visit consultation 5. Support package is effectuatedContext: NA Face to face	To meet the current and long-term needs of young people with cancer for psychosocial help and support and to strengthen the opportunity to return to a healthy youth after cancer treatment	Timing: Newly diagnosed:1–2 months post diagnosis Duration: Unclear, approx. 20 weeks	The program increased the young people’s autonomy with handling consultations and deciding on support from health professionals, and the program also met parents’ needs for support for their teenager. TF: Integrated Assessment Mapping
Hatami and Hojjati (2019) Iran	Quantitative Quasi- experimental	Patients: NA Mothers (n = 36)	Diagnosis: NA Age: 5–15 years	Informational: Session with topics including child’s physiological needs, self-concept, family roles, dependency Hospital Face to face	NA	Timing: At least 1 year post diagnosis Duration: 7 sessions (each lasting 45 min) for 4 consecutive weeks	This model decreases care burden and enhances patient’s adaptability to his/her illness. TF: Roy’s model of adaption

(continued on next page)

Table 2 (continued)

Author(s) (year) Country	Study design	Number of participants	Diagnosis Age of patients	Type and main components Context and delivery	Aim of intervention	Timing in cancer trajectory Duration	Key findings Theoretical framework
Hockenberry et al. (2021) USA	Quantitative Cluster randomized trial	Patients (n = 283) Family: NA	Leukemia (n = 163) Lymphoma (n = 51) Solid tumor (n = 57) CNS (n = 12) Age: 9.36 (mean)	Discharge education: Two components: 1. Symptom management worksheet describing the most commonly experienced treatment-related physical symptoms, strategies to reduce symptom distress, and when and how to contact the can- cer team 2. Coping and support strategies accompanied with a worksheet regarding dealing and coping with a new cancer diagnosis Hospital and outpatient clinic Face to face or telephone Physical care:	To increase understanding of the impact of early discharge education for parents of a child newly diagnosed with cancer	Timing: Newly diagnosed: 3 time points: prior to first hospital discharge, 1 and 2 months post discharge Duration: NA	Parents in both intervention groups felt more confident in their preparedness to care for the child with cancer over time. TF: NA
Hooke et al. (2019) USA	Quantitative Quasi- experimental pilot study used a nonrandomized comparative group design with a historical control	Patients (n = 30) Family: NA	Leukemia (n = 7) Lymphoma (n = 11) Solid tumor (n = 12) Age: 6–18 years	1. Assessing the current status of PA 2. Assessing potential health barriers to PA 3. Determine stage of change. 4. A prescription template was developed that included recom- mendations on frequency and intensity of PA 5. Providing information on resources, e.g. Community resources, inexpensive ways to do PA Hospital Face to face	NA	Timing: 2 month post diagnosis Duration: unclear, intervention delivered during usual care	Children and adolescents did not experience a change in physical activity during treatment TF: NA
Landier et al. (2023) USA	Quantitative Cohort study	Patients (n = 105) Mother (n = 89) Father (n = 12) Others (n = 4)	Leukemia (n = 52) Lymphoma (n = 17) Solid/CNS (n = 36) Age: 7.7 (mean)	Discharge education: A standardized discharge teaching checklist, modular teaching materials for parents, and optimized teaching techniques Hospital Face to face	Increasing the quality of discharge teaching provided to parents	Timing: Newly diagnosed: before first discharge post diagnosis Duration: NA	Process for discharge education changed significantly, parental ratings of readiness for discharge and quality of discharge teaching did not differ and remained high in both the intervened and non-intervened groups. Nurse satisfaction with the quality and process of discharge education significantly increased post-intervention. TF: Meleis's Transition Theory Increased ability to foster a connection with other patients and families outside of the study resulted in a greater appreciation for nurses' role in enhancing advocacy for patients and families. TF: NA
Landon et al. (2019) USA	Qualitative	Patients: NA Family: NA HCP (n = 12)	Diagnosis: NA Age: NA	Psychosocial: Sessions with 3 specific topics: 1. Managing the Chaos: Self Care as the First Step to Supporting Your Teen/Young Adult. 2. How to Listen to and Encourage Your Teen/Young Adult to Talk. 3. Strategies for Teen/Young Adult Autonomy Support: Understand- ing Teen/Young Adult's Ways of Coping Context: NA Delivery: NA	To reduce parent distress and enhance the family environment, resilience, and well-being of AYAs with high-risk cancer and their parents	Timing: NA Duration: 3 × 60-minute sessions	

Larsen et al. (2013) Denmark	Qualitative	Patients (n = 25) Mothers (n = 20) Fathers (n = 5)	Other (n = 25) Age: 7.59 (mean)	Informational: Three components: 1. Including daily medical information relay 2. Five one-hour educational sessions 3. Weekly physical activity sessions Hospital Face to face	To provide daily support to parents with a child undergoing HSCT	Timing: NA Duration: 9 h of intervention per family per week for the duration of the child's 4–6 weeks of hospitalization.	The FNN intervention was a well-accepted intervention component and none of the parents terminated their participation in this component prior to the child's discharge. TF: Roy Adaptation Model
Li et al. (2021) China	Quantitative Before and after study	Patients (n = 109) Family: NA	Leukemia (n = 109) Age: 7–14 years	Informational: A WeChat group established by the nursing staff: 1. At 20:00 every night, intra-group discussions via voice, picture or video to encourage the family members to actively communicate with each other about living and caring experience 2. At the end of each week, the nurse in charge conducted the follow-up through WeChat or telephone Home Online or telephone	NA	Timing: NA Duration: NA	Effective promotion of the nursing ability of parents on children with acute leukemia, improvements of the living quality of children and reduction of parents' adverse psychological moods. TF: NA
Marklund et al. (2018) Sweden	Qualitative Lifeworld Hermeneutic	Total (n = 16) Mother (n = 7) Fathers (n = 5) Siblings (n = 3) Other (n = 1)	Other (n = 7) Age: 1–15 years	Psychosocial support: Two components: 1. Structured conversations 2. A summarizing closing letter Hospital Face to face	To create a context for change and to support the creation of new beliefs, new opportunities, and new meanings in relation to problems that the family has described	Timing: Newly diagnosed: One or two weeks post diagnosis Duration: Each session lasted about 60 min and the time span between the conversations was about four weeks.	Families found help in handling their new situation by taking part in the FamHC. A relatively small investment of two family conversations and a closing letter could have such significance for the families in their difficult situation. TF: Family system approach
Jenholt Nolbris and Ahlmström (2014) Sweden	Qualitative	Patients: NA Siblings (n = 14)	Diagnosis: NA Age: NA	Informational: Two components: 1. Lectures child's cancer diagnosis, treatment and possible side-effects 2. A personal reflection diary Hospital Face to face	To increase sibling knowledge about cancer and thus reduce their anxiety	Timing: Newly diagnosed: From 1 month post diagnosis Duration: Unclear, 16–28 weeks	The intervention could help siblings to become more knowledgeable about the sick child's cancer, leading to a realistic view about treatment, and its consequences as well as about the future. TF: Person-centered care
Park et al. (2023) South Korea	Quantitative Randomized controlled trial	Patients (n = 41) Mothers (n = 41)	Leukemia (n = 33) Lymphoma (n = 8) Age: 10.2 (mean)	Informational: Internet-based program: Educational materials and activity sheets handed out in advance. Session 1. Introduction to the program and the concept of family resilience. Session 2. Medical information about childhood cancer. Session 3. Family rules and resources outside the family was identified. Session 4. Encourage communication in the family. Hospital and home Face to face and online	To promote family-resilience	Timing: NA Duration: 4 weeks with 1 interval. Each session lasting 70 min.	The program resulted in greater changes in family resilience in the experimental group than in the control group. No changes in depression scores. TF: Walsh's Family Resilience Framework
Ringner et al. (2015)	Mixed-method	Patients (n = 5) Mothers (n = 4)	Solid tumor (n = 2) CNS (n = 3)	Informational: Sessions assessing parents needs and expectations, Face to face and online	To increase support and health to families with a child suffering	Timing: 2–3 month post diagnosis Duration: Three one hour meetings	The intervention was feasible. No changes were seen in the

(continued on next page)

Table 2 (continued)

Author(s) (year) Country	Study design	Number of participants	Diagnosis Age of patients	Type and main components Context and delivery	Aim of intervention	Timing in cancer trajectory Duration	Key findings Theoretical framework
Sweden		Fathers (n = 4)	Age: 4–13 years	exploring knowledge gaps, errors, and confusions. Then representing new information and finally goal setting. Hospital and home Face to face or telephone	from cancer	followed by a shorter follow-up meeting some days later. Lasted for 9 weeks	measures of parents' distress. TF: Person-centered representational approach
Ringner et al. (2021) Sweden	Qualitative Process evaluation	Total (n = 13) Mothers (n = 9) Fathers (n = 4)	Leukemia (n = 7) Solid tumor (n = 2) CNS (n = 1) Age: 2–15 years	Informational: 1. The parent identified topics they needed information about. 2. Uncovering parents knowledge about the topic 3. New information was introduced about the topic 4. A summery and discussion about benefits from new received information.Home and hospital Face to face	To reduce parental distress and increase satisfaction with care	Timing: 2–5 months post diagnosis Duration: 4 meetings with mean duration 51 min	Person-centered information can help bridge information gaps experienced by parents in a child oncology setting. One-to-one meetings can provide a room to elaborate concerns that may be difficult to address in a family setting. TF: Person-centered representational approach
Ringnér et al. (2023) Sweden	Quantitative Randomized controlled trial	Patients (n = 24) Mothers (n = 21) Fathers (n = 11)	Leukemia (n = 13) Solid tumor (n = 8) CNS (n = 3) Age: 6.6 (mean)	Informational: Four meetings based on 5 key elements: a. Assessment of current knowledge b. Explore knowledge gaps, confusion, misconceptions c. Discuss knowledge gaps and its potential consequences d. Introducing new knowledge e. Summing up information Hospital Face to face or telephone	To provide person-centered information to parents	Timing: 2–5 month post diagnosis Duration: Meeting lasted in average 51 min	No differences between the intervention and control groups in psychosocial distress outcomes. The intervention group had their knowledge needs about bio physiological and functional aspects met to a larger degree than the control group. Parents in the intervention group were significantly more satisfied with the overall information they had received about their child's disease. TF: The representational approach to patient education developed by Donovan and co-workers
Svavarsdottir and Sigurdardottir (2006) Iceland	Quantitative Quasi-experimental	Patients (n = 10) Mothers (n = 10) Fathers (n = 9)	Lymphoma (n = 1) Leukemia (n = 5) Solid tumor (n = 2) CNS (n = 2) Age: 10.88 (mean)	Informational: 3 components: 1. 137 paged informational Web site where parents could access information about various types of cancer and its effects on families. 2. Internet support – peer to peer interaction or individually interaction with researcher. 3. One or two 60–90 minute support interview(s)Hospital and home Face to face and online	To increase well-being of parents	Timing: Newly diagnosed: within two months post diagnosis Duration unclear: Offered over a period of 4–5 months	For both the mothers and fathers, a significant difference was found in their levels of well-being after the intervention. The level of usefulness of the intervention varied. TF: The Calgary Family Intervention Model
Svavarsdottir and Sigurdardottir (2013) Iceland	Quantitative Quasi experimental	Patients (n = 19) Mothers (n = 10) Fathers (n = 9)	Leukemia or lymphoma (n = 15) CNS (n = 2) Other (n = 1) Missing (n = 1) Age: 0–16 years	Psychosocial: Therapeutic conversation interviews: 1. Drawing a family genogram, family tree, and an ecomap in collaboration with the families 2. Using therapeutic questions 3. Offering recommendations	To increase family support and expressive family functioning	Timing: 2–5 months post diagnosis Duration: 2–3 sessions ranged from 45 to 90 min	A significant difference was found on perceived family support after the intervention compared to before, as well as on the two subscales of cognitive and emotional support. TF: The Calgary Family Intervention Model

Trondle et al. (2021) Brazil	Qualitative	Patients: NA Family: NA HCP (n = 12)	Diagnosis: NA Age: NA	4. Offering commendation and drawing forward family strength. Hospital and outpatient clinic Face to face Physical care: Embrocation, warm compresses, poultices, and wraps with essential oils were introduced into the daily care. Hospital Face to face	To improve patients' well-being	Timing: NA Duration: NA	Patients and health care providers seem to benefit from integrative methods. TF: NA
West et al. (2015) Canada	Qualitative Hermeneutic phenomenology	Patients (n = 3) Mothers (n = 3) Fathers (n = 2) Siblings (n = 8) HCP (n = 3)	Solid (n = 1) CNS (n = 2) Age: >7 years	Psychosocial support: Therapeutic conversations in which clinicians explore family members' illness experience. Hospital Face to face	Reduce illness suffering	Timing: 1 year post diagnosis Duration: 4–6 clinical sessions over a period of 3 to 6 months	The family system intervention facilitated lessening of suffering. TF: Calgary Family Assessment Model and Illness Beliefs Model
Wilson Smith et al. (2018) USA	Quantitative Improvement project	Total (n = 22) Unspecified	Diagnosis: NA Age: NA	Discharge education: Multicomponent: Teaching board, education station, tool kit/bags. Hospital Face to face	The aim for the Road to Home (RTH) program was to develop interactive patient education methods to engage nurses, clinical team members, parents, and patients in the new diagnosis cancer education process	Timing: Newly diagnosed: Before first discharge Duration: NA	Intervention increased family and nurse satisfaction with discharge education and helped assure that families are better prepared to safely care for their child at home. TF: NA
Yu et al. (2014) China	Quantitative Randomized controlled trial	Patients (n = 240) Family: NA	Lymphoma (n = 168) Neuroblastoma (n = 30) Nephroblastoma (n = 24) Hepatoblastoma (n = 18) Age: 3–7 years	Informational: Multiple components: physical, psychological, and social interventions. Context: NA Delivery: NA	Improve preschool children with cancer's social adaption capability (SAC) and quality of life	Timing: NA Duration: 1–12 weeks. Session ranged from 25 to 60 min	The family-centered nursing care model improved the SAC of children with malignancies more effectively than in children subjected to routine nursing care TF: Family-centered care intervention model

3.3.1.2. *Diagnosis.* Clear data on patient diagnoses were reported for 857 patients. Hereof, 53 % (n = 452) had leukemia, 32 % (n = 270) lymphoma, and 13 % (n = 108) had solid tumors, 3 % (n = 27) had brain tumors. 40 % (n = 10) of the studies did not report sufficient data on the cancer diagnosis. Either it remained unclear how the diagnoses were distributed, or unclear data were provided. Thus, data on diagnosis were unavailable for 356 pediatric patients.

3.3.1.3. *Age.* The age of the pediatric patients included in the interventions was reported in a variety of ways. 52 % (n = 13) reported a minimum and maximum age with the broadest range being 0–20 years (Larsen et al., 2013), whereas the narrowest range was 3–7 years (Yu et al., 2014). 20 % (n = 5) did not report any age data.

3.3.2. Family and other target population

A total of 683 participants (other than patients) were represented in 21 interventions. Four interventions only reported data on patients (Li et al., 2021; Yu et al., 2014; Hockenberry et al., 2021; Hooke et al., 2019), even though the interventions by Li et al. (2021) and Yu et al. (2014) also targeted parents. The number of participants (other than patients) included in the interventions ranged from 8 to 110. For 89 % (n = 606) of the participants included, the specific participant role was known and distributed as follows: mothers 75 % (n = 455), fathers 14 % (n = 82), healthcare professionals 5 % (n = 32), siblings 4 % (n = 25), and others 12 % (n = 12). Furthermore, for 11 % (n = 77) of the participants the role was unknown.

Because participant characteristics were reported divergently, we further analyzed specifically who the interventions targeted. The predominant target population of the nursing interventions was parents; 60 % (n = 15), among these, two interventions targeted parents with an indirect benefit for their adolescents (Landon et al., 2019; Haase et al., 2022). 20 % (n = 5) targeted patients (Trondle et al., 2021; Hooke et al., 2019; Ellis et al., 2013; Yu et al., 2014; Hanghøj et al., 2022). The intervention by Hanghøj et al. (2022) specifically targeted young people and partly their parents. 16 % (n = 4) targeted the family as a unit (Wilson Smith et al., 2018; Bensink et al., 2008; West et al., 2015; Marklund et al., 2018). Among these, West et al. (2015) and Marklund et al. (2018) had the mother, father and siblings included as family members, although this was only the case in one out of seven families included in the intervention by Marklund et al. (2018). 4 % (n = 1) targeted siblings exclusively (Jenholt Nollbris and Ahlström, 2014).

3.4. Main components, timing, and delivery modes of the nursing interventions

The heterogeneity of the interventions and the lack of transparency in the reporting of the interventions made it difficult to categorize by intervention type or by intervention content/components. Many interventions combined the content with components targeting social, emotional and/or information support and provided the intervention as individual conversational sessions. The number of components of the interventions varied from one to five, depending on type of intervention, e.g., discharge education with a checklist as a component (Duffy et al., 2021), and a supportive intervention with five core components focusing on ten different domains (Hanghøj et al., 2022). Despite this variety, we identified and summarized the following intervention types based on their main focus: Informational support, psychosocial support, discharge educational support, and physical care. An overview of target populations and study types is presented in Fig. 2 and component details are shown in Table 2.

3.4.1. Informational support

44 % (n = 11) of the interventions provided support through an informational component. These components provided disease-related knowledge on pathophysiology, cancer disease, treatment, and side effects. The supportive components also involved emotional support and were often based on the participant's individual and/or family needs. These interventions were typically based on a series of individual sessions with different

themes and included written materials as well as web-based information. Two interventions (Li et al., 2021; Svavarsdottir and Sigurdardottir, 2006) involved a social component by encouraging and facilitating peer-to-peer interactions. The interventions by (Ringner et al., 2015) adopted a person-centered approach with a specific focus on providing parents with tailored information based on their unique needs.

3.4.2. Discharge educational support

20 % (n = 5) of the interventions were educational and provided information and teaching focused on discharge processes in the diagnostic phase. They mainly focused on enhancing parenting skills in the context of providing care for a child with cancer at home and did so by providing knowledge about disease- and treatment-related topics, e.g., side effect management, medication, prognoses, and basic home-care tasks. Three of these interventions structured the discharge process by incorporating checklists (Landier et al., 2023; Hockenberry et al., 2021; Duffy et al., 2021). One intervention, by Smith et al., had integrated child-friendly components, e.g., a teaching board and education station (Wilson Smith et al., 2018). Finally, one intervention had a follow-up component that was delivered after discharge (Bensink et al., 2008).

3.4.3. Psychosocial support

28 % (n = 7) of the interventions were supportive and mainly focused on psychosocial aspects related to childhood cancer. Three interventions (West et al., 2015; Marklund et al., 2018; Svavarsdottir and Sigurdardottir, 2013) adopted a family-system approach and employed therapeutic conversations to enhance family support and reduce illness-related suffering. Three interventions (Hanghøj et al., 2022; Landon et al., 2019; Haase et al., 2022) focused specifically on adolescents and their parents and combined the interventions with components tailored to the unique needs of young people. Haase et al. (2022), Landon et al. (2019) focused on enhancing parenting skills related to understanding youth's coping skills. Hanghøj et al. (2022) focused mainly on youth as a target group and applied split visits to provide a safe space for the youth, separated from their parents.

One intervention targeted school-aged children exclusively and adopted a social focus by connecting pediatric cancer patients from the hospital to the school using videoconferencing (Ellis et al., 2013).

3.4.4. Physical care

8 % (n = 2) of the interventions focused mainly on the physical condition of the pediatric patient, and both were implemented into daily nursing care practices. One intervention, focused on increasing comfort by integrating embrocation, warm compresses, poultices, and wraps with essential oils into daily nursing care (Trondle et al., 2021). The intervention by Hooke et al. (2019) focused on physical activity coaching and reducing fatigue in children.

3.4.4.1. *Time and duration.* 40 % (n = 10) of interventions started in the newly-diagnosed phase (0–2 months). Among these interventions, 50 % (n = 5) were delivered before the first discharge after the patient had been diagnosed. 20 % (n = 5) were offered from two to five months post diagnosis. 8 % (n = 2) were delivered at least one year after the patient had been diagnosed. 32 % (n = 8) did not provide any data on the timing of delivery.

The duration of interventions varied widely and was reported insufficiently and in very different ways, e.g., intervention duration ranged from 16 to 28 weeks (Jenholt Nollbris and Ahlström, 2014), or from 3 to 6 months (West et al., 2015). In 44 % (n = 11) of the interventions, data on duration were unclear and six of these studies provided no data on duration. Most interventions were delivered as 1–6 sessions. Session length varied from 15 to 105 min, with 36 % (n = 9) of sessions lasting approximately 60 min.

3.4.4.2. *Context and delivery.* All interventions were provided by an oncology hospital service. 44 % (n = 11) were provided at the hospital,

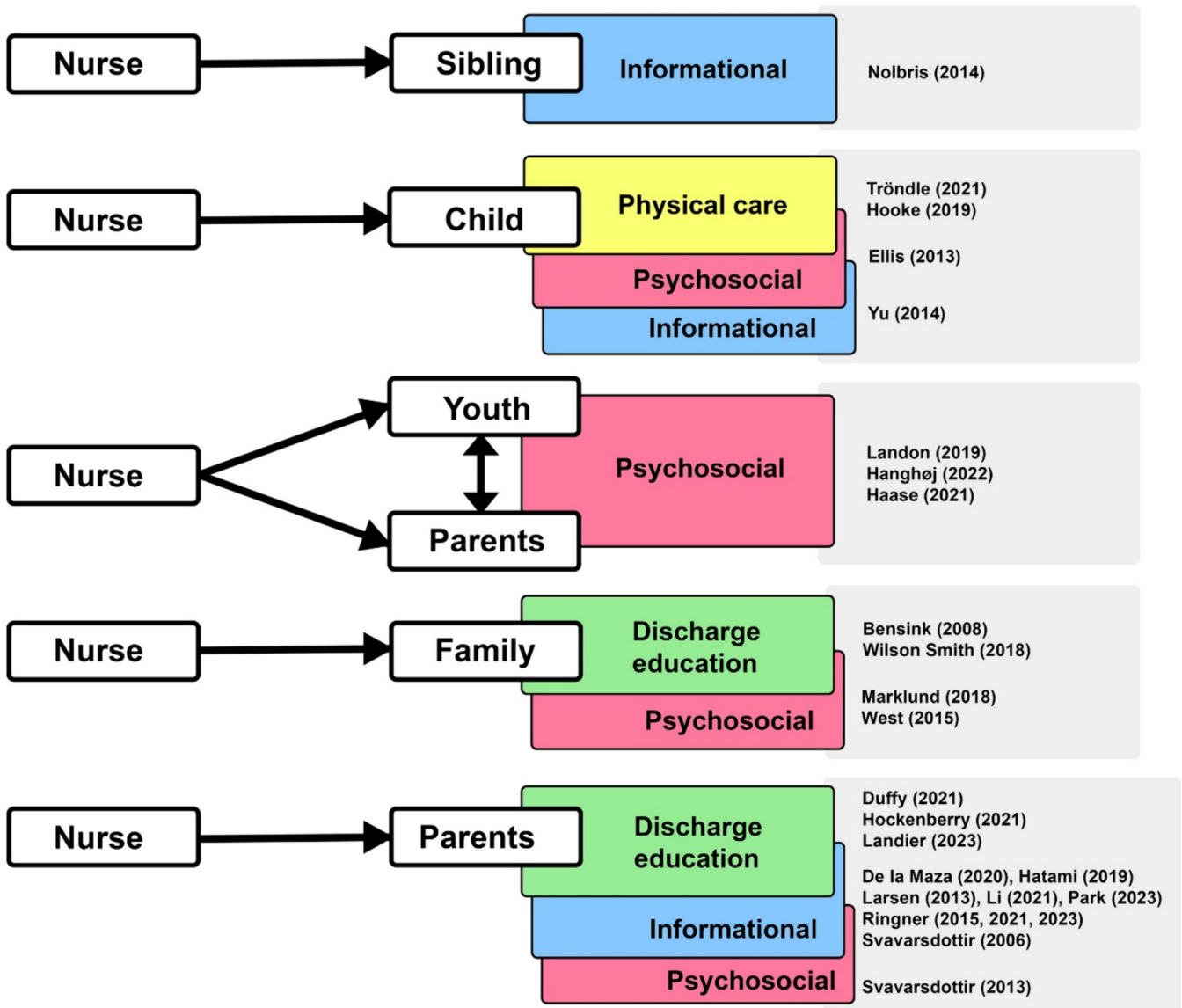


Fig. 2. Overview of target population and study type.

12 % (n = 3) combined an inpatient hospital setting with an outpatient oncology clinic, 8 % (n = 2) of interventions were provided in the home only (remotely delivered), and 20 % (n = 5) combined hospital and home (phone, web, and face to face) delivery. 16 % (n = 4) provided no data on the context for intervention delivery. No interventions were delivered by a nurse visiting the families at home.

3.4.4.3. *Information on nurses.* Considerable variety characterized the educational levels of the nurses delivering the interventions, ranging from nurse practitioners in pediatric oncology to nurses holding doctoral degrees specializing in pediatric oncology. 20 % (n = 5) of the interventions did not provide any information on nurses' educational level. 24 % (n = 6) of the studies provided some information on how the nurses delivering the interventions were trained before initiating the interventions. Training ranged from a 1-hour course to a 3-day workshop. However, no further details were provided about how the nurses were prepared to deliver the interventions.

3.4.4.4. *Impacts of the interventions.* A considerable variety of outcome measures was employed depending on the intervention type. Overall, the studies reported positive results: The informational supporting

intervention type improved clinical outcomes (De la Maza et al., 2020), significantly increased knowledge (Ringner et al., 2021; De la Maza et al., 2020; Jenholt Nolbris and Ahlström, 2014), increased family resilience (Park et al., 2023), improved parent well-being (Svavarsdottir and Sigurdardottir, 2006), reduced the care burden (Hatami and Hojjati, 2019), and enhanced the capacity for social adaption (Yu et al., 2014). Furthermore, a family navigator nurse proved useful for parents to a child undergoing a stem cell transplant (Larsen et al., 2013). The discharge educational interventions enhanced family and nurse satisfaction (Wilson Smith et al., 2018), increased preparedness for discharge (Hockenberry et al., 2021), and improved the quality and process of discharge education (Landier et al., 2023). Additionally, structuring discharge processes in clinical nursing practice appears feasible (Duffy et al., 2021; Bensink et al., 2008; Hockenberry et al., 2021). Participating in the psychosocial intervention increased the young people's sense of autonomy and met the parent's needs to support their child (Hanghøj et al., 2022). The self-care intervention improved parents' confidence, raised their self-awareness (Haase et al., 2022), and enhanced nurses' ability to foster communication among the parents and their child (Landon et al., 2019). The family-based interventions also provided positive results by increasing family support, lessening suffering (West

et al., 2015), and helping families handle their new life situation (Marklund et al., 2018). Three interventions measured, but did not report, changes in psychosocial distress outcomes (Park et al., 2023; Ringné et al., 2023; Ringner et al., 2015).

3.5. Main findings from the perspective of the pediatric patients and/or their family members relating to the interventions

40 % (n = 10) of the interventions comprised perspectives from participants. Overall, the participant perspectives included in the interventions were positive and reported as, e.g., valuable (Larsen et al., 2013), greatly needed (Hanghøj et al., 2022), helpful, useful supportive, important (Ringner et al., 2015), and appreciated (Wilson Smith et al., 2018). The participants were grateful, pleased (Jenholt Nolbris and Ahlström, 2014), and satisfied (Bensink et al., 2008) and parents reported feeling more competent after receiving the intervention (Hockenberry et al., 2021). 60 % (n = 15) did not report information on the perspectives of the participants.

3.6. Suggestions highlighted for further development of interventions

52 % (n = 13) did not provide any suggestions for further development or refinement of their intervention. 16 % (n = 4) provided suggestions related to technology components, e.g., delivering the interventions via interactive media (Jenholt Nolbris and Ahlström, 2014) or smartphone (Duffy et al., 2021). 12 % (n = 3) made suggestions relating to their target population, e.g., introducing screening and modifying interventions to target high-risk patient/family members (Hanghøj et al., 2022; Larsen et al., 2013; Svavarsdóttir and Sigurdardóttir, 2013). Furthermore, 20 % (n = 5) made other intervention-specific recommendations for refinement (Haase et al., 2022; Wilson Smith et al., 2018; Ellis et al., 2013; Ringné et al., 2023).

4. Discussion

In this scoping review, we aimed to identify research papers reporting on nursing interventions available for pediatric patients with cancer and/or their family members.

We included a total of 25 interventions delivered by nurses and provided by hospital services globally from 2005 to 2023. Notably, 88 % (n = 23) of the papers were published from 2013 onward potentially reflecting a positive trend within pediatric oncology nursing as research efforts may be leaning toward conducting intervention studies. However, a substantial need remains for research focusing on nursing aspects in childhood cancer. This is underpinned by the rapidly advancing diagnostic and medical landscape with precision medicine and intensified treatment regimens (Langenberg et al., 2021).

Evolving cancer treatments successfully improves survival rates. However, the treatments also entail increasingly complex medical care tasks with ensuing acute and long-term consequences (Zupanec et al., 2023). In this emerging field, nurses have a considerable impact as they support families throughout their cancer course. Additionally, nurses are the healthcare professionals with the most frequent and close contact to families during admissions. The need for the nursing discipline to keep evolving within this emerging research field is therefore evident.

Considering these facts, the amount of nursing intervention studies published appears rather limited. This finding is consistent with a review by Enskar et al. (2015) that underscored the need for future research studies to transform existing descriptive and explorative research results into clinical practice, preferably through intervention studies. Still, intervention research is challenging in any field, and applying interventions within complex clinical settings such as pediatric oncology increases this complexity, e.g., due to difficulties controlling for confounding factors (Hallberg, 2003), small heterogenic patient populations with age and developmental differences, multi-family

member populations, recruitment and retention challenges (Van Driessche et al., 2023), and prioritizing of medical treatment protocols over supportive care (Sugalski et al., 2021). Using the Medical Research Councils' framework for complex interventions in healthcare is recommended and may guide researchers, allowing them to develop, test, evaluate, and implement complex interventions in clinical contexts (Skivington et al., 2021).

Overall, the nursing interventions varied greatly in terms of, e.g., type, timing, components, and delivery mode. We found that 40 % of the interventions were applied in the diagnostic phase, within the first two months after the patient had been diagnosed. The diagnostic phase is known to be extremely challenging as a cancer diagnosis causes a cascade of sudden and radical changes in the patients' and their families' lives (Rodgers et al., 2016). Information overload in the initial stage of cancer courses is a prevalent phenomenon (Aburn and Gott, 2011). Therefore, in the diagnostic phase, families are provided with only the most important information, e.g., symptom management, medication, tube feeding, and monitoring of side effects (Rodgers et al., 2016). Even so, the diagnostic phase should receive special attention, and it is important to acknowledge the need for support throughout the entire cancer trajectory.

Childhood cancer trajectories are often prolonged and characterized by repeated unpredictable hospitalizations and traumatic events (Gunter and Duke, 2018). Most families adjust and adapt over time, but at different paces (Kazak et al., 2007). Applying timely sensitive interventions is therefore complex and was described as challenging for healthcare professionals (Hocking et al., 2014; Greenzang et al., 2023). Furthermore, the current tendency to discharge patients earlier limits the amount of available time to prepare the families for discharge and places more care responsibilities with the families at home (Wilson Smith et al., 2018).

It is of vital importance to address these emerging issues through interventions that match the changing conditions in pediatric oncology care. The discharge interventions identified in this scoping review appeared feasible and served to increase the quality of nursing care in the early stages of diagnosis (Wilson Smith et al., 2018; Landier et al., 2023). Future research should focus on further developing and testing interventions across pediatric oncology settings.

The need to provide interventions covering a longer period of the cancer course was also identified in this review. A more prolonged approach may contribute to an increased feeling of continuity of care and support. However, depending on the intervention type, the nurses' role varied and the active engagement of the nurses differed greatly. Thus, in two interventions, the nurses' role was (only) to establish social contact to peers (Ellis et al., 2013; Li et al., 2021). Whereas, in other interventions, the nurse had a more prominent role, e.g., providing structured conversations and/or care activities across multiple sessions (Larsen et al., 2013; West et al., 2015). Continuity was explicitly considered in the intervention by Ringner et al. (2021). This intervention comprised several sessions delivered over a longer period of time, tailoring the information given to the parent's unique needs. Establishing therapeutic relationships to families is considered important in pediatric oncology nursing care (McHaro et al., 2022). While psychosocial nursing care is undoubtedly important, research indicates that psychosocial issues in pediatric and adult cancer care alike are overlooked and unmet (Paterson et al., 2023; Lövgren et al., 2020). Modern medical oncology care with intensified multimodal treatment limits the nurses' available time and ability to be supportive and present (Cantrell, 2007; McHaro et al., 2022). The interventions suggested by Marklund et al. (2018), Svavarsdóttir and Sigurdardóttir (2006), and Ringné et al. (2023) may serve to structure the support, ensuring that the support from nurses is prioritized and provided meeting the needs of families.

We identified the target population of the nursing interventions and found that 60 % were parents, resulting in only few interventions being provided to the family as a unit. Mothers were highly overrepresented (75 %). This may be explained by the nature of the cancer course with

frequent and often prolonged hospital stays. Cancer treatment profoundly affects daily family routines and causes disruption in the whole family system (Darcy et al., 2014). In most countries, one caregiver needs to stay in the hospital while the other takes care of siblings and works (Svavarsdottir and Sigurdardottir, 2013). Siblings are considered to be at risk of psychosocial distress when adjusting to childhood cancer, and evidence highlights the importance of sibling support in families with childhood cancer (Woodgate, 2006; Gerhardt et al., 2015). This scoping review identified one intervention specifically targeting siblings (Jenholt Nolbris and Ahlström, 2014). While this finding should be interpreted with caution because of this review's focus on nursing, it is evident that more attention should be devoted to siblings in future intervention studies (Mooney-Doyle et al., 2021). However, it remains unclear what types of support are more beneficial for siblings, and considering how siblings may be reached by interventions is important as contact with siblings is typically restricted to hospital visits (Wawrzynski et al., 2021). One way to include both siblings and other family members is to provide family-based interventions (Meyler et al., 2010). In this scoping review, four interventions had the family-unit as a target group. However, only two interventions included the mother, father, and/or siblings even though the interventions were intended to comprise the whole family. Doing 'family' interventions which include (mostly) mothers and (partly) the sick child may meet the needs of individual family members rather than catering to the needs of the whole family (Wood, 2005). A review by Mattila et al. (2009) on nursing interventions for adult patients and their family members reported a similar finding; the interventions targeted the patient and one family member, excluding other family members. The family as a social system is complex and diverse, and most health research for children and young people is primarily based on the involvement of parents. However, such stakeholder perspectives cannot replace the qualities that come with genuine participation by the children and young people themselves. Thus, developing interventions based on family system theories that include child-centered components, as suggested in the interventions by Wilson Smith et al. (2018), may contribute to more comprehensive care targeting all family members.

Our review revealed major deficiencies in the reporting of the interventions. In particular, intervention descriptions and details on the development process were limited. In general, missing data characterized various data charting items. Most studies lack transparency with regard to timing, duration, target group, and, surprisingly, also the purpose of the intervention. The reason for this may be explained, in part, by the objectives of the studies as they evaluated the corresponding interventions qualitatively (Hanghøj et al., 2022; Landon et al., 2019). However, in most studies, no cross-referencing was used to cite the original intervention, making it difficult to retrieve further information and ultimately reducing our ability to adapt the interventions for use in other contexts. In addition, 52 % of the studies did not provide any suggestions for further refinement or adjustment of the interventions. The tendency toward lack of transparency and under-reporting of intervention development is a well-known problem and may constitute a major obstacle to conducting quality intervention research (Hoffmann et al., 2014; Tricco et al., 2016a). Clear reporting is important for interpreting and translating intervention research into clinical practice. Recently, guidelines were published to ensure a more comprehensive and transparent approach to systematically reporting intervention descriptions and development processes (Hoffmann et al., 2014; Duncan et al., 2020; Möhler et al., 2015). We encourage future intervention studies to adhere to these guidelines. Enhancing the reporting by sufficiently describing interventions increases the possibility of adapting or replicating interventions (Hoffmann et al., 2014). This may, in turn, improve research sustainability and reduce potential research waste. However, the considerable amount of unchartable data did not reflect the research quality. The critical appraisal of the included studies revealed an overall good quality of the qualitative studies, whereas the quantitative studies were more varied in quality.

Notably, no interventions reported involvement of stakeholders in the development process and 60 % of the interventions did not elucidate their participants' perspectives. Research has emphasized the importance of engaging key stakeholders in every stage of health research (Larsson et al., 2018; Grindell et al., 2022). Including views, knowledge, and experiences from the target population is critical in implementation science and improves acceptability and uptake. Furthermore, stakeholder involvement increases the possibility of meeting the unique needs and preferences of patients and family members (Wiener et al., 2020; Skivington et al., 2021). Even though the reporting was flawed, and intervention outcomes were too heterogeneous to compare and measure their effect, most interventions were reported to be highly valued and perceived as beneficial by the participants. This finding was similar across interventions and indicates that nursing interventions hold a considerable potential to increase the quality of pediatric oncology care.

4.1. Limitations

This scoping review identified nursing interventions for childhood cancer patients and families in active treatment. Procedural and pharmacological interventions were excluded as were interventions provided to childhood cancer survivors and palliative patients. Thus, potentially promising interventions were not considered even though we are aware that, e.g., palliative care is not applied exclusively in the end-of-life/non-curative stages. We have focused specifically on cancer diagnosis, knowing that interventions for children and adolescents with rare diseases might be applicable to childhood cancer families. Not all the included studies reported the original intervention as some studies rather reported experiences of participating in interventions. Furthermore, we focused on nursing interventions as a mono-disciplinary activity, thereby excluding interventions delivered by a multidisciplinary team, which may hold a potential for further intervention development. However, we applied a broad search strategy and thus considered nursing interventions regardless of the terminology applied, e.g., programs, models, checklists, or tools. In line with the scoping review methodology, this is considered a strength as it maximizes the inclusion of relevant studies (Peters et al., 2020). Unpublished studies were not considered. Gray literature may be a source of potential nursing interventions provided globally by oncology units. However, due to time constraints, the gray literature was not considered in this review. Thus, this review provided a comprehensive overview of the evidence in current nursing research studies rather than the nursing interventions currently being performed globally as part of daily nursing practices.

5. Conclusion

This review contributes to establishing a more comprehensive understanding of the evidence base in the field of pediatric oncology nursing research. A total of 25 nursing interventions were identified and their characteristics were outlined. Considerable variety was observed with respect to intervention type. The more prevalent type was supportive interventions with an informational focus, provided to mothers in the diagnostic phase. The growing population of pediatric patients and their family members who live with and beyond childhood cancer warrants comprehensive and sustainable nursing interventions seeking to further strengthen the evidence base of nursing research. Practice, policy makers, as well as funding agencies must acknowledge the importance of nursing research to strengthen the evidence base and thus improve families' access to high-quality effective interventions. This review offers a foundation that may serve to inform future intervention development provided within pediatric oncology services. Nursing interventions have potential to improve oncology care quality and strengthen evidence-based practices. Considerable heterogeneity was found with regard to terminology, application, and reporting. We highly recommend that future intervention studies aim to enhance

transparency and recommend engaging in continuous efforts to develop meaningful rigorous interventions. Despite the complexity derived from including the family as a unit and involving key stakeholders in the development phase, future intervention research should strive to do so.

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CRediT authorship contribution statement

Josefine Tang Rørbech: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation. **Pia Dreyer:** Writing – review & editing, Supervision. **Karin Enskär:** Writing – review & editing, Supervision. **Helle Haslund-Thomsen:** Writing – review & editing, Supervision, Conceptualization. **Claus Sixtus Jensen:** Writing – review & editing, Supervision, Formal analysis, Data curation.

Data availability

This article is based on already published studies (review methodology). Therefore data sharing is not relevant.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

- Aburn, G., Gott, M., 2011. Education given to parents of children newly diagnosed with acute lymphoblastic leukemia: a narrative review. *J. Pediatr. Oncol. Nurs.* 28, 300–305. Accelerator, S. R. d. Deduplicator. Available: <https://sr-accelerator.com/#/deduplicator>. (Accessed May 2022) (Online).
- Bensink, M., Armfield, N., Irving, H., Hallahan, A., Theodoros, D., Russell, T., Barnett, A., Scuffham, P., Wootton, R., 2008. A pilot study of videotelephone-based support for newly diagnosed paediatric oncology patients and their families. *J. Telemed. Telecare* 14, 315–321.
- Bleijenberg, N., De Man-van Ginkel, J.M., Trappenburg, J.C.A., Ettema, R.G.A., Sino, C.G., Heim, N., Hafsteindottir, T.B., Richards, D.A., Schuurmans, M.J., 2018. Increasing value and reducing waste by optimizing the development of complex interventions: enriching the development phase of the Medical Research Council (MRC) Framework. *Int. J. Nurs. Stud.* 79, 86–93.
- Cantrell, M.A., 2007. The art of pediatric oncology nursing practice. *J. Pediatr. Oncol. Nurs.* 24, 132–138.
- Coughtrey, A., Millington, A., Bennett, S., Christie, D., Hough, R., Su, M.T., Constantinou, M. P., Shafran, R., 2018. The effectiveness of psychosocial interventions for psychological outcomes in pediatric oncology: a systematic review. *J. Pain Symptom Manag.* 55, 1004–1017.
- Covidence, 2021. Systematic review management. Available: <https://www.covidence.org/>. (Accessed 13 November 2021) (Online).
- Darcy, L., Björk, M., Enskär, K., Knutsson, S., 2014. The process of striving for an ordinary, everyday life, in young children living with cancer, at six months and one year post diagnosis. *Eur. J. Oncol. Nurs.* 18, 605–612.
- Darcy, L., Björk, M., Knutsson, S., Granlund, M., Enskär, K., 2016. Following young children's health and functioning in everyday life through their cancer trajectory. *J. Pediatr. Oncol. Nurs.* 33, 173–189.
- De la Maza, V., Manriquez, M., Castro, M., Viveros, P., Fernandez, M., Vogel, E., Peña, E., Santolaya, M.E., Villarroel, M., Torres, J.P., 2020. Impact of a structured educational programme for caregivers of children with cancer on parental knowledge of the

- disease and paediatric clinical outcomes during the first year of treatment. *Eur. J. Cancer Care* 29, e13294.
- Duffy, E.A., Herriage, T., Ranney, L., Tena, N., 2021. Implementing and evaluating a standardized new diagnosis education checklist: A report from the Children's Oncology Group. *J. Pediatr. Oncol. Nurs.* 38, 322–330.
- Duncan, E., O'cathain, A., Rousseau, N., Croot, L., Sworn, K., Turner, K.M., Yardley, L., Hoddinott, P., 2020. Guidance for reporting intervention development studies in health research (GUIDED): an evidence-based consensus study. *BMJ Open* 10, e033516.
- Ellis, S.J., Drew, D., Wakefield, C.E., Saikal, S.L., Punch, D., Cohn, R.J., 2013. Results of a nurse-led intervention: connecting pediatric cancer patients from the hospital to the school using videoconferencing technologies. *J. Pediatr. Oncol. Nurs.* 30, 333–341.
- Enskär, K., Björk, M., Knutsson, S., Granlund, M., Darcy, L., Huus, K., 2015. A Swedish perspective on nursing and psychosocial research in paediatric oncology: a literature review. *Eur. J. Oncol. Nurs.* 19, 310–317.
- Erker, C., Yan, K., Zhang, L., Bingen, K., Flynn, K.E., Panepinto, J., 2018. Impact of pediatric cancer on family relationships. *Cancer Med.* 7, 1680–1688.
- Erla Kolbrún Svavarsdóttir, A.S., 2005. The feasibility of offering a family level intervention to parents of children with cancer. *Scand. J. Caring Sci.* 19, 358–372.
- Gerhardt, C.A., Lehmann, V., Long, K.A., Alderfer, M.A., 2015. Supporting siblings as a standard of care in pediatric oncology. *Pediatr. Blood Cancer* 62, S678–S732.
- Greenzang, K.A., Scavotto, M.L., Revette, A.C., Schlegel, S.F., Silverman, L.B., Mack, J.W., 2023. "There's no playbook for when your kid has cancer": desired elements of an electronic resource to support pediatric cancer communication. *Pediatr. Blood Cancer* 70, e30198.
- Grindell, C., Coates, E., Croot, L., O'cathain, A., 2022. The use of co-production, co-design and co-creation to mobilise knowledge in the management of health conditions: a systematic review. *BMC Health Serv. Res.* 22, 877.
- Gunter, M.D., Duke, G., 2018. Reducing uncertainty in families dealing with childhood cancers: an integrative literature review. *Pediatr. Nurs.* 44, 21.
- Haase, J.E., Stegenga, K., Robb, S.L., Hooke, M.C., Burns, D.S., Monahan, P.O., Stump, T.E., Henley, A.K., Haut, P.R., Cherven, B., Roll, L., Langevin, A.-M., Pickler, R.H., Albritton, K., Hawkins, D., Osterkamp, E., Mitby, P., Smith, J., Diaz, V.R., Garcia-Frausto, E., Moore, M., 2022. Randomized clinical trial of a self-care and communication intervention for parents of adolescent/young adults undergoing high-risk cancer treatment: a report from the Children's Oncology Group. *Cancer Nurs.* 45, 316–331.
- Hallberg, I.R., 2003. Evidence-based nursing, interventions, and family nursing: methodological obstacles and possibilities. *J. Fam. Nurs.* 9, 3–22.
- Hanghøj, S., Boisen, K.A., Nielsen, M.F., Pappot, H., Hjalgrim, L.L., 2022. A qualitative evaluation of the youth-check program: a psychosocial intervention aimed at young people with cancer. *Semin. Oncol. Nurs.* 38, 151268.
- Hatami, F., Hojjati, H., 2019. Effect of Roy's adaptation model on the care burden of mothers of children under chemotherapy in gorgan in 2018: a quasi-experimental study. *Med. Surg. Nurs. J.* 8 (1).
- Hirt, J., Nordhausen, T., Appenzeller-Herzog, C., Ewald, H., 2023. Citation tracking for systematic literature searching: a scoping review. *Res. Synth. Methods* 14, 563–579.
- Hockenberry, M., Haugen, M., Slaven, A., Skeens, M., Patton, L., Montgomery, K., Trimble, K., Coyle, K., Hancock, D., Ahmad, A., Daut, E., Glover, L., Brown, L., St Pierre, S., Shay, A., Maloney, J., Burke, M., Hatch, D., Arthur, M., 2021. Pediatric education discharge support strategies for newly diagnosed children with cancer. *Cancer Nurs.* 44, E520–E530.
- Hocking, M.C., Kazak, A.E., Schneider, S., Barkman, D., Barakat, L.P., Deatrick, J.A., 2014. Parent perspectives on family-based psychosocial interventions in pediatric cancer: a mixed-methods approach. *Support Care Cancer* 22, 1287–1294.
- Hoffmann, T.C., Glasziou, P.P., Boutron, I., Milne, R., Perera, R., Moher, D., Altman, D.G., Barbour, V., Macdonald, H., Johnston, M., Lamb, S.E., Dixon-Woods, M., McCulloch, P., Wyatt, J.C., Chan, A.W., Michie, S., 2014. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 348, g1687.
- Hong, Q.N., Gonzalez-reyes, A., Pluye, P., 2018. Improving the usefulness of a tool for appraising the quality of qualitative, quantitative and mixed methods studies, the Mixed Methods Appraisal Tool (MMAT). *J. Eval. Clin. Pract.* 24, 459–467.
- Hooke, M.C., Hoelscher, A., Tanner, L.R., Langevin, M., Bronas, U.G., Maciej, J., Mathiason, M.A., 2019. Kids are moving: a physical activity program for children with cancer. *J. Pediatr. Oncol. Nurs.* 36, 379–389.
- Hopia, H., Heino-Tolonen, T., 2019. Families in paediatric oncology nursing: critical incidents from the nurses' perspective. *J. Pediatr. Nurs.* 44, e28–e35.
- Inhestern, L., Paul, V., Winzig, J., Rutkowski, S., Escherich, G., Bergelt, C., 2023. Children with cancer and their families after active treatment: analyses of biopsychosocial needs and implications for healthcare – a study protocol. *BMJ Open* 12, e055633.
- Jenholt Nolbris, M., Ahlström, B.H., 2014. Siblings of children with cancer – their experiences of participating in a person-centered support intervention combining education, learning and reflection: pre- and post-intervention interviews. *Eur. J. Oncol. Nurs.* 18, 254–260.
- Jibb, L.A., Croal, L., Wang, J., Yuan, C., Foster, J., Cheung, V., Gladstone, B.M., Stinson, J.N., 2018. Children's experiences of cancer care: a systematic review and thematic synthesis of qualitative studies. *Oncol. Nurs. Forum* 45, 527–544.
- Kazak, A.E., Noll, R.B., 2015. The integration of psychology in pediatric oncology research and practice: collaboration to improve care and outcomes for children and families. *Am. Psychol.* 70, 146–158.
- Kazak, A.E., Rourke, M.T., Alderfer, M.A., Pai, A., Reilly, A.F., Meadows, A.T., 2007. Evidence-based assessment, intervention and psychosocial care in pediatric oncology: a blueprint for comprehensive services across treatment. *J. Pediatr. Psychol.* 32, 1099–1110.
- Kiernan, G., Meyler, E., Guerin, S., 2010. Psychosocial issues and care in pediatric oncology: medical and nursing professionals' perceptions. *Cancer Nurs.* 33, E12–E20.

- Koumariou, A., Symeonidi, A.E., Kattamis, A., Linardatou, K., Chrousos, G.P., Darviri, C., 2021. A review of psychosocial interventions targeting families of children with cancer. *Palliat. Support. Care* 19, 103–118.
- Lam, C.G., Howard, S.C., Bouffet, E., Pritchard-Jones, K., 2019. Science and health for all children with cancer. *Science (Am. Assoc. Adv.Sci.)* 363, 1182–1186.
- Landier, W., York, J.M., Wadhwa, A., Adams, K., Henneberg, H.M., Madan-Swain, A., Benton, B., Slaty, V., Zupanec, S., Miller, J., Tomlinson, K., Richman, J.S., Bhatia, S., 2023. A structured discharge education intervention for parents of newly diagnosed pediatric oncology patients. *J. Pediatr. Hematol./Oncol. Nurs.* 40, 145–157.
- Landon, L., Crane, S., Nance, S., Stegenga, K., Cherven, B., Perez Prado, L.N., Butrum, K.D., Beacham, B., Haase, J., 2019. Engaging clinical nurses in research: nurses' experiences delivering a communication intervention in a behavioral oncology clinical trial. *Nurs. Adm. Q.* 43, 175–185.
- Langenberg, K.P.S., Looze, E.J., Molenaar, J.J., 2021. The landscape of pediatric precision oncology: program design, actionable alterations, and clinical trial development. *Cancers* 13, 4324.
- Larsen, H.B., Heilmann, C., Johansen, C., Adamsen, L., 2013. Socially disadvantaged parents of children treated with allogeneic haematopoietic stem cell transplantation (HSCT): report from a supportive intervention study, Denmark. *Eur. J. Oncol. Nurs.* 17, 302–310.
- Larsson, I., Staland-Nyman, C., Svedberg, P., Nygren, J.M., Carlsson, I.-M., 2018. Children and young people's participation in developing interventions in health and well-being: a scoping review. *BMC Health Serv. Res.* 18, 507.
- Li, M., Jia, Y., Zhang, L., 2021. The application value of informatization-based extended nursing care on discharged children with leukemia. *Am. J. Transl. Res.* 13, 6952–6958.
- Long, K.A., Lehmann, V., Gerhardt, C.A., Carpenter, A.L., Marsland, A.L., Alderfer, M.A., 2018. Psychosocial functioning and risk factors among siblings of children with cancer: an updated systematic review. *Psycho-oncology (Chichester, England)* 27, 1467–1479.
- Lövgren, M., Udo, C., Alvariza, A., Kreicbergs, U., 2020. Much is left unspoken: self-reports from families in pediatric oncology. *Pediatr. Blood Cancer* 67, e28735.
- Luo, Y.H., Xia, W., He, X.L., Zhang, J.P., Li, H.C.W., 2021. Psychological interventions for enhancing resilience in parents of children with cancer: a systematic review and meta-analysis. *Support Care Cancer* 29, 7101–7110.
- Marklund, S., Sjödin Eriksson, E., Lindh, V., Saveman, B.I., 2018. Family health conversations at a pediatric oncology center – a way for families to rebalance the situation. *J. Pediatr. Nurs.* 38, e59–e65.
- Mattila, E., Leino, K., Paavilainen, E., Åstedt-Kurki, P., 2009. Nursing intervention studies on patients and family members: a systematic literature review. *Scand. J. Caring Sci.* 23, 611–622.
- McHarro, S.K., Bally, J., Spurr, S., 2022. Nursing presence in pediatric oncology: a scoping review. *J. Pediatr. Oncol. Nurs.* 39 (2), 99–113.
- Meyler, E., Guerin, S., Kiernan, G., Breatnach, F., 2010. Review of family-based psychosocial interventions for childhood cancer. *J. Pediatr. Psychol.* 35, 1116–1132.
- Mody, R., Li, S., Dover, D.C., Sallan, S., Leisenring, W., Oeffinger, K.C., Yasui, Y., Robison, L.L., Neglia, J.P., 2008. Twenty-five-year follow-up among survivors of childhood acute lymphoblastic leukemia: a report from the Childhood Cancer Survivor Study. *Blood* 111, 5515–5523.
- Möhler, R., Köpke, S., Meyer, G., 2015. Criteria for Reporting the Development and Evaluation of Complex Interventions in healthcare: revised guideline (CREDECI 2). *Curr. Control. Trials Cardiovasc. Med.* 16, 204.
- Mooney-Doyle, K., Dos Santos, M.R., Woodgate, R.L., 2020. Family-centered Care in Pediatric Oncology. *Pediatric Oncology Nursing*.
- Mooney-Doyle, K., Burley, S., Ludemann, E., Rawlett, K., 2021. Multifaceted support interventions for siblings of children with cancer: a systematic review. *Cancer Nurs.* 44, E609–E635.
- Pai, A.L.H., Greenley, R.N., Lewandowski, A., Drotar, D., Youngstrom, E., Peterson, C.C., 2007. A meta-analytic review of the influence of pediatric cancer on parent and family functioning. *J. Fam. Psychol.* 21, 407–415.
- Park, M., Kim, S., Lee, H., Shin, Y.J., Lyu, C.J., Choi, 2021. Development and effects of an internet-based family resilience-promoting program for parents of children with cancer: a randomized controlled trial. *Eur. J. Oncol. Nurs.* 64, 102332.
- Paterson, C., Toohey, K., BacoN, R., Kavanagh, P.S., Roberts, C., 2023. What are the unmet supportive care needs of people affected by cancer: an umbrella systematic review. *Semin. Oncol. Nurs.* 39, 151353.
- Peikert, M.L., Inhestern, L., Bergelt, C., 2018. Psychosocial interventions for rehabilitation and reintegration into daily life of pediatric cancer survivors and their families: a systematic review. *PLoS One* 13, e0196151.
- Peters, M.D.J., Marnie, C., Tricco, A.C., Pollock, D., Munn, Z., Alexander, L., McInerney, P., Godfrey, C.M., Khalil, H., 2020. Updated methodological guidance for the conduct of scoping reviews. *JBI Evid. Synth.* 18, 2119–2126.
- Pollock, D., Davies, E.L., Peters, M.D.J., Tricco, A.C., Alexander, L., McInerney, P., Godfrey, C.M., Khalil, H., Munn, Z., 2021. Undertaking a scoping review: a practical guide for nursing and midwifery students, clinicians, researchers, and academics. *J. Adv. Nurs.* 77, 2102–2113.
- Pollock, D., Peters, M.D.J., Khalil, H., McInerney, P., Alexander, L., Tricco, A.C., Evans, C., De Moraes, É.B., Godfrey, C.M., Pieper, D., Saran, A., Stern, C., Munn, Z., 2023. Recommendations for the extraction, analysis, and presentation of results in scoping reviews. *JBI Evid. Synth.* 21, 520–532.
- Ringner, A., Karlsson, S., Hallgren Graneheim, U., 2015. A person-centred intervention for providing information to parents of children with cancer. Experiences and effects. *Eur. J. Oncol. Nurs.* 19, 318–324.
- Ringner, A., Olsson, C., Eriksson, E., From, I., Björk, A moment just for me – parents' experiences of an intervention for person-centred information in paediatric oncology. *Eur. J. Oncol. Nurs.* 51, 101923.
- Ringner, A., Björk, M., Olsson, C., 2023. Effects of person-centered information for parents of children with cancer (the PIFBO Study): a randomized controlled trial. *J. Pediatr. Hematol./Oncol. Nurs.* 40 (6), 400–410. <https://doi.org/10.1177/27527530221115860>.
- Robinson, C., Wright, L., 1995. Family nursing interventions: what families say makes a difference. *J. Fam. Nurs.* 1, 327–345.
- Rodgers, C.C., Stegenga, K., Withycombe, J.S., Sachse, K., Kelly, K.P., 2016. Processing information after a child's cancer diagnosis—how parents learn: a report from the Children's Oncology Group. *J. Pediatr. Oncol. Nurs.* 33, 447–459.
- Rørbech, J.T., Dreyer, P., Enskär, K., Haslund-Thomsen, H., Jensen, C.S., 2023. Nursing interventions for pediatric patients with cancer and their families: a scoping review protocol. *JBI Evid. Synth.* 21, 1903–1909.
- Skivington, K., Matthews, L., et al., 2021. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ (Online)* 374, n2061.
- Steele, A.C., Mullins, L.L., Mullins, A.J., Muriel, A.C., 2015. Psychosocial interventions and therapeutic support as a standard of care in pediatric oncology. *Pediatr. Blood Cancer* 62 (Suppl. 5), S585–S618.
- Steliarova-Foucher, E.D., Colombet, M.M., Ries, L.A.G.M.S., Moreno, F.P., Dolya, A.M., Bray, F.P., Hesselting, P.P., Shin, H.Y.P., Stiller, C.A.M., 2017. International incidence of childhood cancer, 2001–10: a population-based registry study. *Lancet Oncol.* 18, 719–731.
- Sugalski, A.J., Lo, T., Beauchemin, M., Grimes, A.C., Robinson, P.D., Walsh, A.M., Santesso, N., Dang, H., Fisher, B.T., Wrightson, A.R., Yu, L.C., Sung, L., Dupuis, L.L., 2021. Facilitators and barriers to clinical practice guideline-consistent supportive care at pediatric oncology institutions: a Children's Oncology Group study. *Implement. Sci. Commun.* 2, 106.
- Svavarsdóttir, E.K., Sigurdardóttir, A.O., 2006. Developing a family-level intervention for families of children with cancer. *Oncol. Nurs. Forum* 33, 983–990.
- Svavarsdóttir, E.K., Sigurdardóttir, A.O., 2013. Benefits of a brief therapeutic conversation intervention for families of children and adolescents in active cancer treatment. *Oncol. Nurs. Forum* 40, E346–E357.
- Tricco, A.C., Ashoor, H.M., Cardoso, R., Macdonald, H., Cogo, E., Kastner, M., Perrier, L., Mckibbin, A., Grimshaw, J.M., Straus, S.E., 2016a. Sustainability of knowledge translation interventions in healthcare decision-making: a scoping review. *Implement. Sci.* 11, 55.
- Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K., Colquhoun, H., Kastner, M., Levac, D., Ng, C., Sharpe, J.P., Wilson, K., Kenny, M., Warren, R., Wilson, C., Stelfox, H.T., Straus, S.E., 2016b. A scoping review on the conduct and reporting of scoping reviews. *BMC Med. Res. Methodol.* 16, 15.
- Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garrity, C., Lewin, S., Godfrey, C.M., Macdonald, M.T., Langlois, E.V., Soares-Weiser, K., Moriarty, J., Clifford, T., Tunçalp, Ö., Straus, S.E., 2018. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. *Ann. Intern. Med.* 169, 467–473.
- Trondle, M., Stritter, W., Odono, V., Peron, K., Ghelman, R., Seifert, G., 2021. Beyond the standard of care: an exploratory qualitative study of an implemented integrative therapeutic care program in a Brazilian pediatric oncology unit. *J. Altern. Complement. Med.* 27, 1002–1010.
- Van Driessche, A., Beernaert, K., Deliens, L., Kars, M.C., Lyon, M.E., Barrera, M., Dussel, V., Bidstrup, P., Rosenberg, A.R., Akard, T.F., Cohen, J., De Vleminck, A., 2023. ntion challenges and strategies in randomized controlled trials of psychosocial interventions for children with cancer and their parents: a collective case study. *Eur. J. Pediatr.* 182, 4683–4706.
- Van Schoors, M., Caes, L., Knoble, N.B., Goubert, L., Verhofstadt, L.L., Alderfer, M.A., 2017. Systematic review: associations between family functioning and child adjustment after pediatric cancer diagnosis: a meta-analysis. *J. Pediatr. Psychol.* 42, 6–18.
- Vasilopoulou, K., Skoutari, A., Siomos, K., Christodoulou, N., 2022. The effects of family therapeutic interventions on mental health and quality of life of children with cancer: a systematic review. *Clin. Child Psychol. Psychiatry* 27, 911–928.
- Wawrzynski, S.E., Schaefer, M.R., Schvaneveldt, N., Alderfer, M.A., 2021. Social support and siblings of children with cancer: a scoping review. *Psychooncology* 30, 1232–1245.
- Weinstein, A.G., Henrich, C.C., 2013. Psychological interventions helping pediatric oncology patients cope with medical procedures: a nurse-centered approach. *Eur. J. Oncol. Nurs.* 17, 726–731.
- West, C.H., Bell, J.M., Woodgate, R.L., Moules, N.J., 2015. Waiting to return to normal: an exploration of family systems intervention in childhood cancer. *J. Fam. Nurs.* 21, 261–294.
- Wiener, L., Devine, K.A., Thompson, A.L., 2020. Advances in pediatric psychooncology. *Curr. Opin. Pediatr.* 32, 41–47.
- Wilson Smith, M.G., Sachse, K., Perry, M.T., 2018. Road to home program: a performance improvement initiative to increase family and nurse satisfaction with the discharge education process for newly diagnosed pediatric oncology patients. *J. Pediatr. Oncol. Nurs.* 35, 368–374.
- Withycombe, J.S., Haugen, M., Zupanec, S., Macpherson, C.F., Landier, W., 2019. Consensus recommendations from the Children's Oncology Group Nursing Discipline's State of the Science Symposium: symptom assessment during childhood cancer treatment. *J. Pediatr. Oncol. Nurs.* 36, 294–299.
- Wood, B.L., 2005. Commentary: is it time for family-based interventions in pediatric psych? *J. Pediatr. Psychol.* 30, 694–697.
- Woodgate, R.L., 2006. Siblings' experiences with childhood cancer: a different way of being in the family. *Cancer Nurs.* 29, 406–414.
- Yu, L., Mo, L., Tang, Y., Huang, X., Tan, J., 2014. Effects of nursing intervention models on social adaptation capability development in preschool children with malignant tumors: a randomized control trial. *Psychooncology* 23, 708–712.
- Zupanec, S., Herriage, T., Landier, W., 2023. Children's Oncology Group 2023 blueprint: nursing discipline. *Pediatr. Blood Cancer* 70, e30575.