

## REVIEW ARTICLE

# Nursing interventions to cover patients' basic needs in the intensive care context – A systematic review

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Email: Marie.H.Larsen@ldh.no**Abstract****Aim:** To examine the content, theoretical frameworks and effectiveness of nursing interventions utilizing patient-reported outcome measures (PROMs) in the intensive care unit (ICU).**Design:** A systematic review and narrative synthesis following the guidelines of the preferred reporting items for systematic reviews and meta-analysis checklist.**Methods:** We searched the MEDLINE, CINAHL, PsycINFO, SweMed and Cochrane controlled trials register (CENTRAL) databases for studies evaluating interventions primarily delivered by nurses in the ICU. Two independent reviewers performed study selection, data extraction and risk of bias.**Results:** Twenty-two studies were included, whereas only seven studies used a theoretical framework. The interventions were heterogeneous in content, duration and choice of PROMs. Outcomes were related to covering patients' and families' basic needs, described by Henderson as essential functions of nursing. Several studies reported positive intervention effects, and nurses' communication and psychosocial care were considered essential components of nursing interventions in the ICU.**KEYWORDS**

basic needs, intensive care, literature review, nursing interventions

## 1 | INTRODUCTION

Being acute or critically ill is stressful for both patients and their kin, and these patients require continued help and support in concert with the best medical treatment (Bizek & Fontaine, 2013; Dias et al., 2015). Modern intensive care is based on collaboration between professional groups; however, intensive care nurses are continually present with the patient in intensive care units (ICUs) to monitor their condition and coordinate their care. Henderson (1966) defined a nurse's universal function as the responsibility of assisting the patient in covering their basic needs whilst being in vulnerable situations and helping the individual become independent of assistance. Henderson also proposed 14 components of basic nursing care that attend to the patient's physiological, psychological, spiritual

and social needs (Furukawa & Howe, 1995; Henderson, 1966). To take care of the whole person and their families, nurses in the ICU conduct independent interventions that attend to the patients' and their families' basic needs. These interventions are complex, multicomponent health services (Campbell et al., 2000) and may have many potential active ingredients; the question is which components contribute to the best outcomes.

Patient-reported outcome measures (PROMs) are standardized self-reported data collection techniques focusing on the patient's health status (Valderas et al., 2008). They highlight the patient's or their family's viewpoint rather than focusing on purely clinical outcomes, thereby improving patient-centred care (Kynoch et al., 2020). Accordingly, nurses need to understand and use outcomes measured from both clinical and patient/family perspectives to guide

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their nursing practice and help tailor treatment to meet the patient preferences and needs in the ICU.

## 2 | BACKGROUND

Hoorn et al. (2016) indicated in their systematic review that interventions involving communication aids such as communication boards, speaking valves, electrolarynx and “high-tech” augmentative tools improved communication with mechanically ventilated patients in the ICU. Horsten et al. (2018) reviewed studies assessing patients' and healthy volunteers' sleep in the ICU and reported that noise reduction in the ICU might benefit patients' sleep. Topçu et al. (2017) found that ICU patients' physical and psychological experiences comprised more negative experiences than positive ones. Furthermore, a systematic review of family needs in the ICU revealed that communication interventions promote family involvement and decision-making capacity and reduce the development of posttraumatic stress disorder (PTSD) – related symptoms in the patients (Kynoch et al., 2016).

To improve outcomes and explore the role of basic needs in nursing interventions, this systematic review examined the interventional content, theoretical perspectives, the methodological quality and effectiveness of such interventions in the ICU by utilizing PROMs published in international databases in 2009–2020.

## 3 | THE STUDY

### 3.1 | Design

This systematic review was conducted according to the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines. The protocol was registered in PROSPERO (registration number CRD4201810688).

### 3.2 | Method

#### 3.2.1 | Eligibility criteria

Randomized controlled trials (RCTs), quasi-RCTs (with inadequate sequence allocation or pre-/post-design) and controlled clinical trials were considered eligible for inclusion if they met the following criteria: (a) Trials including adults ( $\geq 18$  years) admitted to an ICU, (b) trials that assessed an intervention that targeted nursing interventions, and (c) the intervention included patient (or family members') self-reported outcome measures (PROMs).

In this study, a nurse-initiated intervention was defined as any treatment based on clinical judgement and knowledge and supported through evidence-based practice research that a nurse might

perform to enhance patient/client outcomes. Table 1 details the inclusion and exclusion criteria and the PICO.

#### 3.2.2 | Search strategy

First, we performed a broad systematic literature search for articles that contained the terms “critically ill patient,” “critical care” and “critical care nursing.” These terms were then combined with the concept of nursing intervention, including synonyms.

The search strategy was further developed by all three authors in collaboration with an experienced research librarian. The following databases were searched: MEDLINE, CINAHL, PsycINFO, SweMed and the Cochrane Controlled Trials Register. The first search was performed in February 2018 and repeated in September 2020, using the same search strategy. The search was limited to studies published in English or Scandinavian languages within 2008–2020. An example of the search strategy (MEDLINE) is listed in Appendix S1. We also screened the reference lists of included or relevant articles to retrieve additional references.

#### 3.2.3 | Study selection

Two reviewers (GJ and MHL) independently assessed titles and abstracts and determined their eligibility using the electronic Rayyan application (<https://www.rayyan.ai>) to expedite the initial screening of abstracts and titles. Full texts were obtained for potentially relevant studies, which were then screened independently by the two reviewers. Disagreements were resolved by discussion. Figure 1 presents the PRISMA flowchart for study selection.

#### 3.2.4 | Data extraction

The data from the included papers were extracted independently by the two reviewers using a standard data collection form that included author, year, country of origin, aim, design and theoretical framework, population, description of interventional content and results.

#### 3.2.5 | Quality assessment

The methodological quality of each study and an evaluation of the risk of systematic bias (RoB) were assessed independently by the two reviewers following the approach described in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2011; Higgins JPT, 2020). Six sources of bias were considered: Selection bias, performance bias, detection bias, attrition bias, reporting bias and other biases. The RoB was rated as low, high or unclear. There were few disagreements, and all were resolved by consensus.

TABLE 1 PICOd with inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
P- Patients/Problem	Critically ill adult patients ( $\geq 18$ years) and their relatives. Context: Intensive care units.	Children and adolescents $< 18$ years. Postoperative care and medical procedures
I -Interventions	Interventions with direct nursing involvement such as the administration of a treatment, psychosocial support, drug or education performed by a nurse. Studies involving testing the route of administration (as ICU nurses usually decide which route of administration to administer).	Studies in which the intervention was administered by other healthcare professionals (e.g. studies where nurses assisted on other healthcare providers' interventions) Studies that test the benefits of one drug over another (these interventions are considered to be medical rather than nursing interventions). Studies that investigated the sensitivity, reliability or validity of different ICU-relevant assessment tools.
C- Comparison	Treatment as usual Other interventions without nurses	All studies without a control group
O- Outcome	All relevant patient or family reported outcomes related to nursing interventions, for example, patient satisfaction, quality of life, anxiety, pain or basic needs assessments.	Staff-related outcomes Outcomes related to medical procedures Studies reporting only clinical outcomes
Designs	Randomized controlled trials Controlled trials Quasi randomized trials	Qualitative studies, cross-sectional studies, cohort studies and mixed methods design. Any type of systematic or non-systematic review, non-peer reviewed articles, conference proceedings, comments or opinion articles, official guidelines, editorials, abstracts and doctoral thesis.

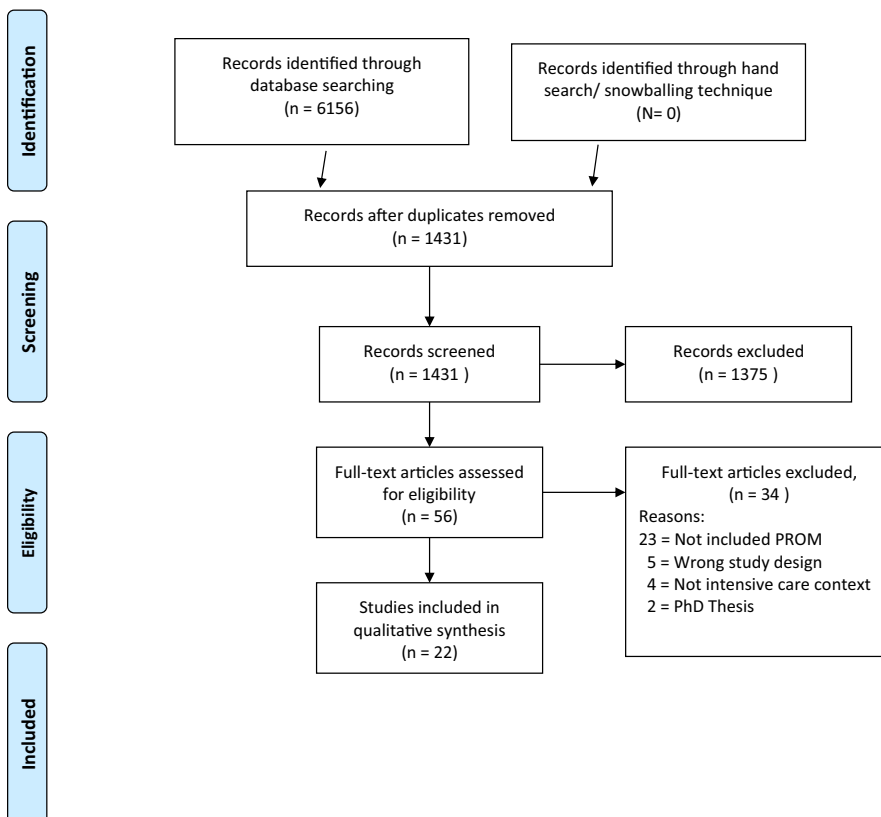


FIGURE 1 PRISMA flow diagram for study selection. From: Moher et al. (2009). For more information, visit [www.prismastatement.org](http://www.prismastatement.org)

### 3.2.6 | Data synthesis and analysis

Because of the considerable diversity and heterogeneity in the types of interventions, outcome measures and study designs, quantitative synthesis of the data was not justified and may be misleading (Jadad et al., 1998). Consequently, a narrative presentation of the interventions seemed appropriate (Khan et al., 2011).

We divided the studies based on their interventions into two groups: patient-focused and family-focused interventions. We used the PRISMA checklist for reporting systematic reviews during manuscript preparation to ensure transparency (Liberati et al., 2009).

## 4 | RESULTS

The database searches yielded 6,156 articles, whilst no additional records were identified through the manual searches. After the removal of duplicate entries, the titles and abstracts of 1,431 articles were screened, of which 1,375 were excluded. The remaining 56 articles were read in full text and 22 of them were included in the review (Figure 1).

### 4.1 | Study characteristics

Six of the eight family-focused interventions and eight of the 14 patient-focused interventions are published in 2016 or later (64%). The studies included 4,274 participants in total (3,391 in the patient-focused interventions and 883 in the family focused interventions). Sixty-two ICUs were represented across all studies. The studies were conducted across nine countries: nine from the United States, three from China, two from the United Kingdom, and one study each from Turkey, Iran, Sweden, Spain, Germany and Australia. One study from Denmark was published in two parts one with a patient focus and one with a family focus (Jensen et al., 2016 and Bohart et al., 2018, Tables 2 and 3). In total 36% ( $N = 8$ ) of the studies presented a theoretical framework and 59% ( $N = 13$ ) of the interventions presented a positive effect of the interventions (presented in more detail in chapters 4.4 and 4.5).

### 4.2 | Quality assessments

The RoB assessment results are outlined in Figure 2 and an additional figure in Figure S1. Eleven studies scored a high RoB on random sequence generation or allocation concealment (selection bias) due to lack of randomization or insufficient descriptions of the procedure. The item with the highest RoB scores was "blinding of participants and personnel," where 19 of the studies had high risk. One study was scored as unclear risk, and only the Danish study (with two publications) was scored as low risk. Many studies also reached a high-risk score on the item "blinding of outcome

assessments." However, in the item regarding selective reporting, 19 studies received a low RoB score. No studies were excluded from being included in the review or effect presentations due to poor methodological quality.

### 4.3 | Description of the interventional content and scope

#### 4.3.1 | Patient-focused interventions

The 14 patient-focused nursing interventions varied in scope, length of the intervention, length of follow-up and outcome measures, making them heterogeneous in several ways. The focus areas were communication, patients' needs relating to pain relief or sleep or recovery care, or the more long-term psychological effects of an ICU stay, such as PTSD, digestion or emergency actions.

Five studies described interventions aiming to increase information and communication needs between nurses and patients in the ICU setting. Happ et al. (2014) trained nurses in communication skills to increase communication frequency and positive nurse communication behaviours between nurses and patients about pain and other symptoms. Rodriguez et al. (2016) tested a technology-based communication system between intubated patients and the nursing staff to determine whether a touch screen with pictorial hot buttons with symptoms or needs or an "I need help" emergency button influenced the difficulty, satisfaction or frustration of communication by ICU patients. Fleischer et al. (2014) tested whether an information programme about the ICU stay could reduce the ICU patients' anxiety. The intervention was compared with non-specific conversations of the same length. Two of the newest studies tested the effect of different aids to ease communication between patients and staff. Koszalski et al. (2020) pilot-tested a patient-centred communication app, compared with a hospital-provided communication board. Trotta et al. (2020) evaluated the implementation of 6–10 min online training modules for ICU nurses, aiming to address the need for skills for communicating with non-vocal patients.

Six studies tested different rehabilitation techniques or recovery care models to meet the patients' needs during or after the ICU stay. Cuthbertson et al. (2009) tested the effect of nurse-led intensive care follow-up after discharge. The included patients joined a physical rehabilitation programme for 3 months, with nurses' follow-ups being at 3 and 9 months. The intervention was compared with usual care. Jensen et al. (2016) and Bohart et al. (2018) explored the effect on patients (and families) of a nurse-led intensive care recovery programme. The nurses participated in a 10-day workshop on the Salutogenic model's theoretical aspects, person-centred communication, illness narratives and self-determination theory. The intervention consisted of three nurse consultations with the patient and a family member. Wade et al. (2019) evaluated the effect of a therapeutic ICU environment and three stress support sessions delivered by trained ICU nurses

TABLE 2 Characteristics of the 14 included patient-focused interventions

First author/Year / Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Chlan et al. (2017) USA	To determine if self-administration of dexmedetomidine by patients is safe and acceptable for self-management compared to standard nurse administered sedatives.	Randomized pilot trial. Theory: No theoretical framework described.	N = 37 Study group: N = 17 adult intubated patients Control group: N = 20, usual care Setting 3 intensive care units: (1) Medical intensive care unit (14 beds); (2) Surgical intensive care unit (21 beds); (3) Medical- surgical intensive care unit (24 beds).	Study gr: Self-administration of dexmedetomidine by push button on medication infusion device in PCA x 3 self-administered bolus doses/ hour (20 min lockout), nurses increased / decreased basal infusion/ 2 hr based on number of bolus doses. (up to 5 days) Control gr: Standard care of current sedative regime with doses/ frequencies administered by primary care team.	Anxiety (VAS scale), Self-reported satisfaction (anxiety and ability to self-administer)	No significant effect on anxiety between groups. Ninety-two per cent of study group patients satisfied/ very satisfied with ability to self administer medication and control anxiety (62%).
Cuthbertson et al. (2009) UK	To test the hypothesis that nurse-led follow-up programmes are effective and cost effective in improving quality of life after discharge from intensive care.	Pragmatic, non-blinded, randomized controlled trial. Theory: No theoretical framework described.	N = 286 (192 patients completed follow-up one year) Study group: N = 143 Control group: N = 143 Setting: 3 hospitals (2 teaching hospitals and 1 District General Hospital)	Study gr: Joined a manual-based physical rehabilitation programme that started in hospital and continued for 3 months - Reviewed at nurse led clinics Control gr: standard care (GP follow up or hospital speciality if needed)	Primary: Health-related quality of life (SF36) at 12 months Secondary: SF36 at 6 months, cost effectiveness analysis, QALY at 12 months. Post-traumatic stress disorder (Davidson trauma score), anxiety and depression (HADS) at 6 and 12 months	Nurse-led intensive care follow-up programme showed no evidence of being effective or cost-effective in improving patients' quality of life in the year after discharge from intensive care.
Fleischer et al. (2014) Germany	To evaluate whether a structured information program that intensifies information given in standard care process reduces anxiety in ICU patients.	Prospective, two-armed, non-blinded, parallel-group randomized controlled trial. Theory: Lazarus' cognitive-mediation theory of stress and emotion.	N = 211 elective and none-elective ICU patients; Study group N = 104 Control group N = 107 Setting: 3 hospitals 3 ICUs: Cardiac surgery General surgery Internal medicine	Study gr: A single episode of structured oral information by study nurse that was given in addition to standard care and covered two main parts: (1) A more standardized part about predefined ICU specific aspects- mainly procedural, sensory and coping information. (2) An individualized part about fears and questions of the patient Control gr: none-specific episodic conversation of similar length additional to standard care. (topics: overall health, family, occupational concerns etc)	Primary Anxiety & quality of life related part on questionnaire for surgical ICU patients (CINT) Secondary Faces Anxiety Scale (FAS) (VAS scale) 24 + 48 hr after intervention state scale of the state and trait anxiety inventory (STAI), VAS scale on anxiety (0-100) + 3 months after discharge: quality of life (SF12), schedule for evaluation og individual quality of life (SEIQoL)	There were no significant or clinically relevant differences between the two groups for the primary or secondary outcomes

(Continues)

TABLE 2 (Continued)

First author/Year / Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Happ et al. (2014) USA	To test the impact of two levels of intervention on communication frequency, quality, success and ease between nurses and intubated intensive care unit patients.	Quasi-experimental clinical trial, three-phase sequential cohort design. Theory: No theoretical framework described.	N = 89 intubated patients awake, responsive and unable to speak (responding to commands) + N = 30 ICU nurses (10 nurses per phase) Setting: University affiliated medical center, Medical Intensive care Unit (MICU) -32 beds + 22 bed CT-ICU - (cardio-vascular-thoracic intensive care unit).	Study gr 1 (Phase 2): 4 hr basic communication skills training (BCST) for nurses (augmentative and assistive communication and relationship-centred care) using low tech materials Study gr. 2: Basic course + 2 hr additional training in electronic communication devices and speech language pathologist consultation (AAC + SLP) Control gr. Usual care (Phase 1)	Four video observations for each patient during two consecutive days. Video recordings measured: frequency and quality and success scored by patient self report (1-5) sedation agitation (RASS), patients self-rated communication ease (1-5)	1. Communication frequency and positive nurse communication behaviour increased significantly in one ICU. 2. Percentage of successful communication exchanges about pain were greater for the two intervention groups than the control group across both ICUs. 3. Patients in the AAC + SLP group used significantly more AAC methods.
Jensen et al. (2016) Denmark	To test the effectiveness of a post-ICU recovery program compared to standard care during the first year after the ICU discharge.	Pragmatic two-armed parallel-group, RCT. Theory: Psychological recovery (including Antonovsky's salutogenic model and guided self-determination and cognitive behavioural therapy).	N = 386 Study group N = 190 Control group N = 196 Setting: 10 ICUs: 1 cardiac ICU + 9 general ICUs	Study gr: Nurse-led intensive care recovery program after ICU discharge (3 consultations with study nurse: First in clinic with patient and close relatives 1-3 months after ICU stay, 2 + 3 consultations by telephone after 5 and 10 months). Patients prepared by completing "reflection sheets" with 16 unfinished sentences Control gr: Standard care	Primary outcome: Health-related quality of life at 12 months (HRQL): SF36 Secondary outcomes: sense of coherence (SOC), anxiety, depression (HADS), post-traumatic stress disorder (HTQ-IV) assessed at 3 and 12 months after ICU discharge including utilization of health care services at 12 months	No statistically significant difference was observed in primary or secondary outcome measures at 2 and 12 months.
Karadag et al. (2017) Turkey	To investigate the effect of lavender essential oil on the sleep quality and anxiety level of patients in coronary ICU.	Randomized controlled study. Theory: No theoretical framework described.	N = 60 patients Study group N = 30 Control group: N = 30 Setting: Coronary Intensive units (CICU)	Study gr: Given 2% lavender essential oil via inhalation for 20 min in 15 days Control gr: Treatment as usual	Pittsburg sleep quality index (PSQI) Beck anxiety inventory (BAI) questionnaire baseline + after 15 days	Lavender essential oil increased quality of sleep and reduced level of anxiety of patients with coronary artery disease ( $p < 0.05$ ).

(Continues)

TABLE 2 (Continued)

First author/Year / Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Koszalinski et al. (2020) USA	To pilot test the effect of a patient-centred communication app -"Speak for myself"- Voice (SFM-V) compared to hospital provided communication boards in various ICUs.	Equivalent control group design. Theory: No theoretical framework described.	N = 36 Study group N = 22 Control group: N = 14 Setting: Five ICU units at a university associated teaching hospital with Magnet status.	Study gr: Nurses presented the SFM-V to assist in patient indication of pain, basic needs (repositioning, water, etc.) and in requests to see family or spiritual advisors + free text possibilities. Control gr: Presented with communication boards to ease communication	Hospital anxiety and depression scale (HADS)	Significant between group difference in patient reported symptoms of depression ( $p = .006$ ) and clinical significance in reduction of anxiety in the study group pre-postintervention.
Rodriguez et al. (2016) USA	To determine the impact of a technology-based communication intervention on patients' perception of communication difficulty, satisfaction with communication methods and frustration with communication.	Quasi-experimental, four cohorts repeated measures design (Data collected daily for up to 10 days). Theory: No theoretical framework described.	N = 115 Study group: N = 52, Cohort 2, Cohort 4 Control gr: N = 63 Cohort 1, Cohort 3 Setting: Adult critical care units- two tertiary institutions	Study gr: Communication system on tablet with pictorial hot buttons with premade spoken messages representing symptoms or needs Control gr: Usual care: Giving participants access to call light and providing pen and paper on which to write messages.	Primary outcomes: confusion assessment method for the intensive care unit, Richmond agitation sedation scale, perception of communication difficulty questionnaire, frustration with communication, satisfaction, Acute Physiology and Chronic Health Evaluation 2.	Participants in the intervention group reported lower mean frustration levels ( $p < .001$ ) and higher mean satisfaction levels ( $p < .001$ ) compared to controls + study group reported consistent increase in perception of communication ease during the hospital stay.
Saadatmand et al. (2015) Iran	To evaluate the effect of pleasant, natural sounds on self-reported pain in patients receiving mechanical ventilation support.	Pragmatic parallel-arm randomized Placebo-controlled trial. Theory: No theoretical framework described.	N = 60 receiving mechanical ventilation support. Study group: N = 30 Control gr: N = 30 Setting: General intensive care unit in a teaching hospital.	Study gr: Heard pleasant natural sounds through headphones. Control gr: Heard nothing. Participants in both arms used headphones for 90 min	Self-reported VAS scale for pain baseline, 30, 60 and 90 min into the intervention and 30 min post intervention	Pain scores in the intervention arm fell and were significantly lower than in control arm group at each time point ( $p < .05$ ).

(Continues)

TABLE 2 (Continued)

First author/Year / Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Scotto et al. (2009) USA	To determine the effects of ear plug use on the subjective experience of sleep for patients in critical care unit.	Quasi-experimental intervention study with random assignment of subjects. Theory: No theoretical framework described.	N = 88 Study group: N = 49 Control group: N = 39 (non-ventilated, non sedated) Setting: Teaching hospital—12 beds units admits av variety og medical and cardiac patients ~20 beds unit admit primarily cardiac patients units	Study gr: Received instruction on use of earplugs from the nurse and used them for one night Control gr: no ear plugs	Verran Snyder Halpern Sleep scale (8 question VAS scale on subjective sleep) completed before noon on the day following the intervention.	The total sleep satisfaction scores were significant better for the study group ( $p = .002$ ). Seven of the subjective categories were independently significant ( $p = .05-.44$ ) compared to controls. No difference in satisfaction with the amount of time needed to fall asleep ( $p = .11$ ).
Sosebee et al. (2017) USA	To assess benefits of the acuity-adapable (AA) care model in rural hospitals.	Mixed -methods study composed of a pilot clinical trial. Theory: Duffy's Quality Caring Model.	N = 71 Study group N = 43 Control group: N = 28 Setting: ICU Rural facility	Study gr: Acuity-adaptable (AA-condition): remained in the ICU room through discharge. Control gr: Standard of care condition: transferred out of ICU when acuity permitted.	Hospital anxiety and depression Scale (HADS). Patient evaluation of emotional care (PEECH) + focus groups with four staff members after the intervention.	Acuity-adaptable (AA) patients reported significantly more anxiety ( $t = 2.42$ , $p = .03$ ) and less perceived emotional care than ICU patients transferring out. Intensive care nurses resisted caring for less acute patients.
Trotta et al. (2020) USA	To evaluate the feasibility and impact of implementing the "study of patient-nurse effectiveness with assisted communication strategies (SPEACS-2)".	Pre/posttest design Theory: No theoretical framework described (but the plan-do - study - act quality improvement methodology used in implementation).	N = 354 nonvocal patients (intubated <24 hr) (N = 204 completed the ESC measure) Setting: Five ICU's (one medical, four surgical within a adademic medical center)	A total of 385 nurses were trained to perform SPEACS-2 during 6 weeks - 6 x 10 min online training modules (total 1 hr) addressing skills for communication with non vocal patient + use of communication cart (stocked with iPads with communication apps. Four phase intervention (Plan, Do, post intervention (3 weeks) + Act (implementation phase).	The ease of communication Scale (ECS) in phase 1 and 3 of the intervention (pre + post intervention)	The ECS scale showed significant improvements from pre to postintervention ( $p = .027$ ).

(Continues)



TABLE 2 (Continued)

First author/Year / Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Wade et al. (2019) UK	To determine whether a nurse-led preventive complex psychological intervention initiated in the ICU reduced patient reported PTSD symptoms severity at 6 months.	Multicenter parallel group cluster randomized clinical trial. Theory: cognitive behavioral therapy (CBT) briefly described.	N = 1458 Study group ICUs: N = 12, 669 participants Control group ICUs: N = 12, 789 participants Setting: 24 ICU's in the UK	Study gr: promotion of a therapeutic ICU environment + 3 stress support sessions (approximately 30 minutes) and a recovery and relaxation program delivered by trained ICU nurses. Control gr: Usual care	PTSD symptom scale self report (PSS-SR) questionnaire at 6 months. Anxiety and depression (HADS) and health-related quality of life (European quality of life -5 dimensions).	There were no significant differences in either primary nor secondary outcomes at 6 months including anxiety, depression or HRQoL
Wu et al. (2020) China	To explore the application effects of comprehensive nursing intervention in intensive care units and its influence on the prognosis of patients.	Quasi experimental controlled trial. Theory: No theoretical framework described.	N = 110 Study group N = 56 Control group: N = 54 Setting: Department of Cardiology	Study gr: Nursed under a comprehensive nursing intervention mode: based on basic health nursing, psychological nursing, nursing about diet and digestion and sleep nursing + health education on drugs and emergency actions Control gr: nursed under a routine ICU nursing mode.	Self-rating anxiety scale (SAS), the self-rating depression scale (SDS) and the Pittsburgh sleep quality index (PSQI) + exercise of self care agency scale (ESCA) + ORTC quality of life questionnaire + nursing satisfaction Results measured after 2 weeks	The study group had significantly lower SAS, SDS and PSQI scores compared to the control group. study group had significantly higher scores in self concept, self-care ability, health knowledge and self responsibility compared to controls (all $p > .05$ ). Nursing satisfaction higher in the intervention group compared to controls ( $p < .05$ ).

Abbreviations: HADS, hospital anxiety and depression scale; HRQoL, health-related quality of life; ICU, intensive care unit; QALY, Quality adjusted life years.

TABLE 3 Characteristics of the family-focused interventions (N = 8)

First author/Year /Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Bohart et al. (2018) Denmark Secondary analysis from the study by Jensen (2016)	To determine whether relatives benefit from a recovery programme intended for intensive care survivors	Multi-centre non-blinded two-armed pragmatic randomized controlled trial Theory: No theoretical framework described	N = 181 Study group: N = 87 Control group: N = 94 Setting: 10 intensive care units	Study gr: Received a recovery programme consisting of three consultations by specially trained study nurses at the hospital + by telephone (5- & 10-months post ICU) – supporting the patient in the constructing of an illness narrative. Control gr: Informational needs of patients and relatives and patient care (sedation, early mobilization, physical rehabilitation and ICU discharge without follow-up).	Primary: HRQoL measured by the medical health survey short-form 36 (mental component) at 12 months post ICU, secondary: HRQoL, sense of coherence, anxiety, depression (HADS), PTSD (Harvard Trauma Questionnaire) at 3 + 12 months post ICU.	No statistically significant differences were observed in primary or secondary outcomes measured at 3 and 12 months neither in intention to treat or Per protocol analysis.
Chiang et al. (2017) China	To determine whether "education of families by tab" about the patient's condition was more associated with improved anxiety, stress and depression levels than "education of families by routine"	Randomized controlled trial (RCT) Theory: No theoretical framework described	74 main family members: Study group: (EF-T) N = 39 Control group (ET-Routine): N = 35 Setting: Adult intensive care unit Public district hospital	Study gr: The EF-T intervention contained two parts: General information about the ICU care and explanation of instruments used. 2: episodic explained depending on the needs of individual patients. Control gr: Received routine information, provision and education about patients' condition. Explanation of clinical information through verbal communication with MFC».	Primary: The depression anxiety stress scale (DASS) & Communication and physical comfort scale	Significant reduction of overall stress level between the 2 groups ( $p < .05$ , medium effect size), but no significant effect when referring to interaction effect ( $p < .05$ ). Significant interaction effect in depression between groups ( $p < .01$ ). No significant difference in satisfaction between groups.
Mao et al. (2020) China	To evaluate the value of family empowerment in improving caring ability and preparedness of main caregivers and provide psychological support and rehabilitation nursing guidance for patients.	Randomized controlled trial Theory: Family empowerment?	N = 86 patients and their families Study group: N = 43 Control group: N = 43 Setting: Neurosurgery intensive care unit	Study gr: Three stages of family empowerment nursing: 1: psychological counselling at admission 2; process from 3 day after admission to 1 day before discharge (explore care problems), grasp psychological status, address negative emotions, and formulate a holistic care plan for the patient. 3: information before discharge on post-operative problems and emergency treatment methods introduced to build confidence Control gr: Conventional nursing	Questionnaire after 6 weeks; SF 36 (quality of life) + family responsibility, treatment compliance and nursing satisfaction	Significantly higher scores in the study group on psychological nursing, comfortable services and necessary information ( $p < .05$ ) compared to control group + sign higher scores in SF 36 scores in the study group compared to preintervention. Significantly better nursing satisfaction compliance scores and incidence of complications in the study group compared to controls ( $p < .05$ ).

(Continues)

TABLE 3 (Continued)

First author/ Year /Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Mitchell et al. (2009) Australia	To evaluate the effect of a family centred nursing intervention on the perceptions of family members of critical care patients of family-centred care as measured by respect, collaboration and support.	Pragmatic clinical trial with a non-equivalent control group pretest-post-test design Theory: The Family Centered Care Model	N = 174 Study group: N = 99 Control group: N = 75, 1 self-nominated family member per patient Setting: Combined surgical and medical critical care units - two teaching hospitals	Study gr: Nurses helped patients' family members participate in fundamental care - nurses clearly instructed in family-centred care activities Control gr: Unchanged nursing care (another site)	-1 self-reporting survey baseline + at 48 hr Adapted version of the family-centred care Survey (measured respect, collaboration and support)	Partnering with patient's family members to provide fundamental care to the patients significantly improved the respect, collaboration, support and overall scores on the family-centred care survey at 48 hr.
Rodriguez- Huerta et al. (2019) Spain	To evaluate whether an informative intervention by nursing professionals through short message service (SMS) improved patients' family members satisfaction with the intensive care experience.	Exploratory two-armed randomised non- pharmacological prospective study Theory: No theoretical framework described	N = 70 Study group: N = 34 Named contact persons Control group: N = 36 Setting: 20 bed ICU (cardiology, cardiac surgery, neurosurgery services)	Study gr: SMS information based on patients' nursing assessment based on Virginia Henderson model for informing daily (12:00) between 3 and 8 days Control gr: Same attention and care as the study group participants without the informative SMS	Satisfaction level of named contact person the critical care family needs inventory questionnaire (CCFNI)	The CCFNI showed significant better scores in the intervention group compared to controls ( $p = .0012$ ) = person that received SMS more satisfied than those who did not. Study participants regarded the SMS information as very helpful
Shelton et al. (2010) USA	Examined the effect of adding a full-time family support coordinator to the surgical intensive care unit team on family satisfaction, length-of- stay and cost	Quasi-experimental design in two phases Theory: No theoretical framework described	N = 227 Before intervention: N = 114 After intervention N = 113 Setting: Surgical intensive care unit SICU	Study gr Implementation of a family support coordinator (nurse) full time who had daily interaction with the families (10mos) Control gr: (baseline) Before intervention (8mos), Normal ICU staff	Critical care family assistance program family satisfaction survey	Implementation of the family support coordinator full time increased family satisfaction across a range of parameters. Largest difference in physician communication ( $p = .0034$ ). Decreases in length-of-stay and costs were not statistically significant
Torke et al. (2016) USA	Conduct a pilot randomized controlled of family navigator (FN), a distinct nursing role to address family members' unmet communication needs early in the ICU stay	Randomized controlled pilot intervention trial Theory: Self Developed Conceptual Model (SDM)	N = 26 Study group: N = 13 surrogate/ patient pairs Control group: N = 13 surrogate/ patient pairs Setting: A tertiary referral hospital, intensive care unit - 18 beds	Study group: Introductory meeting with FN, daily contact (>90% of patient days), information and 13 emotional support modules, family meeting and follow-up phone calls Control group: Usual care:	Illness severity (decisional conflict scale), Patient health questionnaire (PHQ)(6-8 weeks) + the generalized anxiety disorder (GADs) scale + interviews (6-8 weeks)	No significant differences in severity of PHQ or GADs score between groups (stress, anxiety, depression, decision conflict or decision regret) between groups. Feasibility: Open-ended comments from both surrogates and clinicians were uniformly positive

(Continues)

TABLE 3 (Continued)

First author/ Year /Country	Aim	Design and theoretical framework	Study population and setting	Description of the intervention and control	Primary/ secondary PROM outcomes	Results related to the aim of the systematic review
Ågren et al. (2019) Sweden	To investigate outcomes of a nurse-led health promoting conversation intervention in families with a member who was formally critically ill.	Pilot randomized controlled trial (pre-test/ post-test design) Theory: The health promoting family conversation model- derived from Salutogenic and constructivistic approaches	N = 17 families (45 members) Study group: 7 families Control group: 10 families Setting: Hospital in connection with a follow-up visit	Study gr: Health-promoting interventions Control gr: Receiving usual care	The general functioning sub scale, the family sense of coherence, the herth hope index and the medical outcome short form health survey, SF36 health-related quality of life, (HRQoL)	The intervention improved family function over time ( $p = .03$ ), strengthened family well-being in short-term ( $p = .01$ ) and increased perceived HRQoL. No effect on long-term family well- being regarding hope.

on PTSD symptoms after 6 months. Wu et al. (2020) explored the application of a comprehensive nursing intervention encompassing basic health needs such as psychological nursing, nursing about diet, digestion and sleep, in addition to health education on drugs and emergency actions. Sosebee et al. (2017) aimed to study if patients who stayed in the ICU environment throughout their hospital stay experienced less anxiety than patients who were transferred out of the ICU as soon as their condition allowed for transferral.

Four interventions aimed to reduce the patients' pain or increase their sleep quality.

Saadatmand et al. (2015) tested the effect of pleasant natural sounds on self-reported pain in mechanically ventilated patients. Participants heard pleasant sounds for 90 min, whereas the control group was not made to hear any specific sounds. Chlan et al. (2017) determined if self-administered dexmedetomidine was safe and acceptable for self-management of anxiety during ventilatory support, whilst the control group continued their current sedative regimen. Karadag et al. (2017) tested the effect of aromatherapy on patients' sleep quality and anxiety. The intervention patients received lavender essential oil inhalation for 15 days, whereas the control group did not receive any inhalations. Scotto et al. (2009) tested whether the use of earplugs had any effect on the subjective experience of ICU patients' sleep.

#### 4.3.2 | Family-focused interventions

The family-focused interventions were more homogenous in content and focused mostly on the families' need for information and staff cooperation in the ICU.

Chiang et al. (2017) determined whether educating the families using a tablet was associated with less anxiety, stress and depression than the usual family education in the ICU. Rodríguez-Huerta et al. (2019) evaluated whether an informative intervention through short message service (SMS) improved family members' satisfaction with their loved ones' ICU stay. Henderson's model (1966) was used to guide practice, and nurses sent daily SMS to the family's contact person, informing about the daily delivered nursing interventions to their sick family members.

Mitchell et al. (2009) evaluated the effects of giving the critical care nurses instructions in family-centred care activities and partnering with families in providing the patients with fundamental care. This intervention was compared with usual care. Ågren et al. (2019) investigated the outcomes of nurse-led health-promoting conversations with families a member of which had been critically ill and compare the outcomes to usual care. Mao et al. evaluated family empowerment (2020) after improving primary caregivers' caring ability, providing psychological nursing support and comparing the outcomes to usual care. Shelton et al. (2010) examined the effect on family satisfaction, length of stay and costs of adding a full-time family support coordinator nurse to the team. The effect on family satisfaction was compared with a previous phase of care without

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Ågren et al.	+	+	-	-	?	+	-
Chian et al.	+	+	-	-	?	+	-
Chiang et al.	?	?	-	+	?	-	-
Cuthbertson et al.	+	+	-	+	+	?	?
Fleischer et al.	+	+	?	?	?	+	+
Happ et al.	-	-	-	-	+	+	?
Jensen et al. / Bohart et al.	+	+	+	?	+	+	+
Karadag et al.	-	-	-	+	?	+	?
Kozsalinski et al.	-	-	-	?	-	+	?
Mao et al.	-	-	-	-	?	+	?
Mitchell et al.	-	-	-	?	?	+	?
Rodriguez et al.	-	-	-	-	?	+	+
Rodriguez-Huerta et al.	+	+	-	?	-	+	?
Saadatmand et al.	+	+	-	-	+	+	?
Scotto et al.	-	?	-	?	?	+	-
Shelton et al.	-	-	-	-	-	+	+
Sosebee et al.	-	-	-	-	-	+	-
Torke et al.	+	+	-	-	-	+	-
Trotta et al.	-	-	-	-	?	+	?
Wade et al.	+	+	-	-	+	+	?
Wu et al.	-	-	-	?	?	+	?

FIGURE 2 Risk of bias summary: review authors' judgements about each risk of bias item for each included study

the coordinator. Torke et al. (2016) implemented a family navigator to guide ICU conversations, address families' unmet communication needs and compared the intervention to usual care.

#### 4.4 | Use of theoretical framework

Four of the 14 patient-focused interventions used a theoretical framework as the foundation for the interventional content. Sosebee et al. (2017) used Duffy's Quality Caring Model, which describes the patient-nurse relationship and collaborative relationship. Lazarus' cognitive-mediation theory of stress and emotion was used by Fleischer et al. (2014) to evaluate whether a structured information programme reduced ICU patients' anxiety. Jensen et al. (2016) combined Antonovsky's salutogenic model, the guided self-determination approach, and cognitive behavioural therapy (10). Finally, Wade et al. (2019) briefly described cognitive behavioural therapy as a framework for their post ICU recovery programme. Moreover, Trotta et al. (2020) used "The plan-do-study-act" quality improvement methodology to implement their communication intervention.

Four of the eight family-focused interventions used a theoretical framework. Torke et al. (2016) used a self-developed conceptual model to guide ICU conversations, including values, acknowledgement, listening, understanding and eliciting the families' unmet communication needs. Mitchell et al. (2009) described the family-centred care model, emphasizing patient and family participation in care decisions. The health-promoting conversations model derived from salutogenic and constructivist approaches was used by Ågren et al. (2019), and Mao et al. (2020) described empowerment theory as an inspiration for their family-based intervention.

#### 4.5 | Outcomes and instruments

Two studies used different visual analogue scales (VAS) as their only PROM measure (Chlan et al., 2017; Saadatmand et al., 2015), and four used different instruments as their sole measure: A study-specific survey (Mitchell et al., 2009), the hospital anxiety and depression scale (HADS) (Kozsalinski et al., 2020), ease of communication scale (ECS) (Trotta et al., 2020) or a sleep assessment scale (Scotto et al., 2009). Other studies applied several PROM measures to assess the effect of the interventions.

The HADS was used in four studies (Cuthbertson et al., 2009; Jensen et al., 2016; Kozsalinski et al., 2020; Sosebee et al., 2017), and two studies applied different VAS scales on anxiety (Chlan et al., 2017; Fleischer et al., 2014). Other measures were Beck's anxiety inventory (Karadag et al., 2017), the faces anxiety scale (FAS), the state scale and the trait anxiety inventory (TAI) (Fleischer et al., 2014), the self-rating anxiety scale (SAS) and the depression sc

health-related quality of life was measured in eight studies (Ågren et al., 2019; Bohart et al., 2018; Cuthbertson et al., 2009; Fleischer et al., 2014; Jensen et al., 2016; Mao et al., 2020; Wade et al., 2019; Wu et al., 2020), where S.F. 13 and 36 were the most common measures. Three studies measured sleep quality (Karadag et al., 2017; Scotto et al., 2009; Wu et al., 2020), and one study measured pain (Karadag et al., 2017). An overview of the outcomes is displayed in Appendix S2.

#### 4.6 | Effect of the nursing interventions

Eight of the nine studies of patient-focused interventions reported significant effects compared with controls. Happ et al. (2014) demonstrated that communication frequency and positive nurse communication behaviour increased significantly in one of the ICUs. Trotta et al. (2020) reported a significant improvement in "The ease of communication Scale" post-intervention ( $p = .027$ ) compared with baseline. Rodríguez et al. (2016) reported that nonvocal patients receiving a novel table communication system reported lower mean frustration levels ( $p < .001$ ) and higher mean satisfaction levels ( $p < .001$ ) compared with controls, and a consistent increase in the perception of communication ease during the hospital stay.

Saadatmand et al. (2015) revealed that the intervention arm's pain scores decreased whilst listening to natural sounds and that the pain scores in the intervention group were significantly lower than in the control group at each time point ( $p < .05$ ). Karadag et al. (2017) reported that lavender essential oil increased the quality of sleep and reduced the level of anxiety in patients with coronary artery disease ( $p < .005$ ). In the sleep intervention by Scotto et al. (2009), the total sleep satisfaction scores were significantly better for the study group ( $p = .002$ ) than for the controls. Wu et al. (2020) demonstrated that the study group had significantly higher self-concept scores, self-care ability, health knowledge, self-responsibility and nursing satisfaction than the control group (all  $p < .05$ ). Moreover, patients reported better sleep and lower anxiety and depression levels ( $p < .05$ ) than controls. Koszalski et al. (2020) found significantly less depression ( $p = .006$ ) and clinical significance in reducing anxiety in the study group compared with controls after the implementation of patient-centred communication. Sosebee et al. (2017) reported significantly more anxiety ( $p = .003$ ) and less perceived emotional care in the intervention group than in patients receiving usual care. Five studies found no significant effects of the interventions.

Five of the eight family-focused interventions demonstrated significant effects. Chiang et al. (2017) identified a significant interaction effect on depression ( $p < .01$ ). Mitchell et al. (2009) reported a significant increase in collaboration support, and overall satisfaction after 48 hr of family-centred care and Shelton et al. (2010) found that a family coordinator significantly increased the families' satisfaction across several parameters. Mao et al.'s (2020) empowerment intervention described significantly higher scores in the study group on nursing satisfaction, comfortable services and necessary

information ( $p < .05$ ) compared with the control group and reduced incidence of complications in the study group compared with controls ( $p < .05$ ). Rodríguez-Huerta et al. (2019) found that the family members who received information about the patients' condition on SMS were more satisfied than controls ( $p = .0012$ ). This is similar to the findings of Ågren et al. (2019), who reported that their intervention improved family function over time ( $p = .03$ ), strengthened family well-being in the short term ( $p = .01$ ), and increased perceived health-related quality of life (HRQoL).

## 5 | DISCUSSION

This review described the interventional content, theoretical perspectives and effectiveness of nursing interventions in the ICU context reported by patients and families. Furthermore, to the best of our knowledge, this is the first study to assess and discuss the independent nursing interventions in the ICU in relation to Henderson's theory of nursing.

The study interventions describe how nurses take care of patients' physiological and psychosocial needs, such as pain reduction, sleep, communication and expressing emotions. Furthermore, the interventions aimed to prevent the late effects of ICU stay, such as depression, PTSD and anxiety (Davydow et al., 2008; Righy et al., 2019), and that the family's needs for support were taken care of. The interventions mirror essential aspects of the unique functions of nursing in the ICU context. However, the description of each intervention's content was scarce, especially concerning the independent part of nursing.

This gap leads to the following questions. Is the independent contribution of nurses difficult to separate from nurses' assisting function in medical treatment? Or are the nurses' functions in the ICU so interwoven with medical treatment that it is possible to talk only about collaborative functions and not about unique nursing functions? Or are we just beginning to research the independent nursing interventions in the ICU and, as such, lack the language to describe nurses' specific contribution to the outcomes of treatment and care?

Our updated search indicated an increased focus on family-focused interventions in the ICU context in 2019–2020. These studies describe more complex interventions with a more apparent independent nursing function and a broader description of nurses' role, which indicates a research field in progress. Furthermore, the new studies describe more comprehensive interventions with longer intervention and follow-up durations (Ågren et al., 2019; Torke et al., 2016; Trotta et al., 2020; Wade et al., 2019). This seems promising, as more thorough reports on each component of the interventions make the implementation more probable, which in turn may impact the outcomes. On the contrary, Wade et al.'s preventive psychological intervention to alleviate acute stress and memories of frightening ICU experiences (2019) found no effect of the intervention. This may be because the complex stress support sessions were not delivered as intended by the ICU nurses. The process evaluation

showed that the nurses, even if they felt fully equipped to deliver sessions after training, found it difficult to deal with patients with complex needs. Future studies should evaluate how to provide sufficient training to enable nurses to deliver such complex interventions or whether they need to be delivered by stress-relieving experts. In addition, the ICU culture and the challenges involved in changing long-term practice may also be barriers to implementing such interventions.

Fifty-nine per cent of the nursing interventions reported a positive effect on some clinical outcomes. The studies are heterogeneous and do not clearly identify the optimal effective nursing interventions in intensive care. However, they do offer potential strategies for future interventions and present promising elements, for example, a small trial such as Koszalinski et al. (2020) showed a significant effect on anxiety and depression after testing a patient-centred communication app. Also, another technology-based communication intervention showed a significant effect on ICU patients' satisfaction and reduced frustration levels (Rodríguez et al., 2016). Furthermore, the family-focused interventions demonstrated significant effects, for example, when nurses helped family members participate in fundamental care (Mitchell et al., 2009), or increased information about the patient by providing short message service to their families (Rodríguez-Huerta et al., 2019). The importance of effective staff-family relationships and tailored communication are the main conclusions from a recent qualitative systematic review of the experiences and needs of families with a relative admitted to an ICU (Kynoch et al., 2021). These results are in line with our review and underscore the importance of providing supportive care models to help the patient and the family cope with the tremendous impact of an intensive care experience. Such interventions may have a great potential to provide positive effects for the patients and the families.

A systematic review by Scheunemann et al. (2011) concluded that printed information and structured communication improve the families' outcomes and reduce the length of ICU stay for the patients. Other systematic reviews have also indicated that most studies on complex interventions in health care, regardless of profession, report postintervention results, whilst the content of the interventions remains poorly described (Oakley et al., 2006; Stuijbergen et al., 2010). The lack of reporting on each intervention component (structure, content and methods) may be an obstacle for implementation and may inhibit further research (Clark, 2013). For example, in studies where ICU patients inhaled essential lavender oil for 15 days Karadag et al. (2017) or used earplugs for better sleep (Scotto et al., 2009) did not report if and how the nurses provided the intervention or how they were used in practice.

Our systematic review showed that only seven of 22 interventions were guided by a theoretical framework. The theories were consistent with Henderson's definition of nursing (1966) in the sense that the patients' basic needs were attended to. In particular, the utilization of patients' inherent resources constitutes an essential foundation for recovery, and their need to be independent was acknowledged. For example, Duffy's Quality Caring Model

(Duffy, 2013, 2016) was used to study patients' effects in the ICU environment throughout their stay. The model describes the patient-nurse relationship as the core of the therapeutic process and aligns with Henderson's focus on the patients' and families' basic human needs for communication and nurses' independent functions in meeting those needs (Gonzalo, 2019; Henderson, 1966). The outcomes indicated that it was not an advantage for patients to stay continually in the ICU, as they reported more anxiety and less emotional care compared with usual care. In this case, the theory served to uncover the lack of quality as an outcome, which in turn informs practice to reduce the length of the ICU stay. Our study highlights the importance of using theories to guide the development of nursing interventions in the ICU in the future. Lazarus' cognitive-mediation theory of stress and emotion (1999) was used in an intervention encompassing structured information to reduce anxiety (Fleischer et al., 2014). The theory emphasizes the cognitive aspects of developing anxiety and stress and aligns with Henderson's psychosocial needs description.

Torke et al. (2016) used a self-developed conceptual model to propose that communication quality affects decision-making, which in turn affects the outcome for patients and families. Ågren et al. (2019) included the health-promoting family conversation model to improve communication with ICU families. These models are all linked to Henderson's description of basic communication needs (1966). Fleischer et al. (2014) used the family-centred care model, implying patient and family participation in healthcare decisions, which is in line with Henderson's idea of taking care of the psychosocial needs and supporting the patient's progress towards independence. Moreover, the theory embraces the ICU nurses' independent relationships with patients and families and caring as an essential aspect of nursing (Duffy, 2016; Meleis, 2018).

All the interventions included in our review involved actions and interactions with ICU patients and their families. The nurse was present at the bedside, establishing trust and safety and making the situation more understandable and bearable for the patient and significant others. These interventions are "the critical core of the therapeutic process" (Duffy, 2013, 2016) and constitute fundamental parts of "the art of nursing" that are necessary to accomplish treatment and care. It has to do with *how the care is done as opposed to what is done*, which can be some essential active ingredients for the recovery of ICU patients.

The interventions presented numerous outcomes, mirroring the interventions' heterogeneous content; however, only a few studies identified a clear primary outcome. This may be connected to the diversity of components of the interventions and the challenges of choosing singular outcomes to mirror comprehensive nursing. Notably, most outcomes were related to psychosocial needs and communication, clarifying these needs as essential components of nurses' independent functions. Our findings are in line with the previous research showing that communication interventions help promote family involvement in the patients' care and facilitate their decision-making capacity (Kynoch et al., 2016). Furthermore, the

ICU environment, i.e., the high-technology and the patients' critical condition, makes it difficult for patients to express themselves. Thus, nurses' communication and psychosocial care can be of utmost importance for improved outcomes. As such, the complexity adds a dimension to nursing's core functions (Henderson, 1966) when it comes to covering patients' and families' basic needs.

## 5.1 | Strengths and limitations

An essential strength of this review is that it is built on extensive and thoroughly executed literature searches. Another strength is the use of rigorous screening and quality assessment procedures done by multiple researchers. A third strength is that 59% of the studies we included in this review were with RCT design. The findings confirmed the importance of independent nursing interventions in the ICU context. The interventions included only direct nursing involvement, such as nurse-administered treatment, psychosocial support, drugs or education. Hence, the study provides a valuable knowledge base for future studies and practical indications for nurses for successfully planning and conducting nursing interventions in the ICU.

The review has some limitations. One is that we included only studies with adult patients ( $\geq 18$  years). Also, only eight of 22 interventions used a theoretical framework, which may be a limitation. Even if the use of theory was limited, the theoretical frameworks used seemed relevant. Another obvious limitation was our limited ability to pool the data into a meta-analysis. Furthermore, as many as 12 studies scored a high RoB on the selection bias item, implying limited methodological quality. Future studies on nurses' contribution to the ICU should include high-quality RCTs, conducted with a more detailed description of the intervention components to reduce the risk of bias.

## 6 | CONCLUSIONS

The results of this systematic review highlighted nurses' communication and psychosocial care as essential parts of independent nursing interventions in the ICU context. The high-technology environment of the ICU and the patients' critical condition may make it difficult for patients to express themselves. The complexity adds a dimension to nursing when it comes to covering patients' basic needs in the ICU. Future studies should thoroughly describe the structure, content and methods of the interventions. A description of each of the intervention components is necessary to convey what the intervention consists of and ensure proper implementation. This will make it easier to identify possible active ingredients and conclude on nurses' contribution to the outcomes.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

GJ and KH had the initial study idea and made substantial contributions to conception and design, MHL and KH drafted the manuscript. MHL and GJ have participated in acquisition of data and quality assessment and all authors have contributed during analyzing and interpretation. Also, all authors have contributed to revising the manuscript critically for important intellectual content and have given final approval to publish in Nursing Open. We have no conflict of interest.

## ETHICAL APPROVAL

This systematic review did not require patient consent or Research Ethics Committee approval.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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## SUPPORTING INFORMATION

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