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Sleep, Circadian Disruption, and the Organization of Night-Time Care in Advanced Illness: A Scoping Review of Nonpharmacological Interventions and Implications for Integrative Palliative Nursing

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Abstract

Sleep disturbance and circadian disruption are common in advanced illness, where pain, dyspnoea, psychological distress, treatment effects, medication exposure, reduced daytime activity, environmental disturbance, and night-time clinical care can interact. Nonpharmacological approaches may be attractive in palliative settings because they can complement symptom management without automatically adding medication burden, yet evidence spans heterogeneous interventions and rarely examines how nursing work and night-time care organization shape implementation. To map empirical evidence on nonpharmacological approaches relevant to sleep and circadian disturbance in adults with advanced illness and to examine how timing, feasibility, patient preference, environmental conditions, and organization of palliative nursing care affect interpretation and translation. Empirical studies published from 2017 through 2024 were eligible when they examined adults with advanced, incurable, or metastatic cancer or comparable advanced serious illness in palliative, hospice, supportive, or end-of-life contexts; or palliative-care personnel when the study directly addressed organization or implementation of sleep-promoting care. Eligible concepts included behavioral, environmental, light-based, exercise or mind-body, biofeedback, massage, mindfulness, and directly sleep-related nursing or service practices. A reproducibility search was conducted across scholarly bibliographic and supplementary citation routes using combinations of advanced illness, palliative care, sleep, insomnia, circadian disturbance, nonpharmacological intervention, and night-time nursing terms. Eligibility was restricted to the prespecified 2017–2024 publication window. Study design, population, setting, intervention or organizational exposure, sleep-related measurement, clinical timing, principal findings, feasibility, contrary or null findings, and applicability limitations were charted. Evidence was mapped descriptively rather than pooled for comparative effectiveness. Fifty records were captured before deduplication. After removal of 8 duplicates and 9 records outside the publication window, 33 records underwent title/abstract screening. Thirteen were excluded, 20 full texts were assessed, and 6 were excluded at full-text review, leaving 14 empirical evidence units. Eleven examined patient-level nonpharmacological interventions and three examined nursing or service-organization issues. The evidence covered exercise and mind-body approaches, cognitive-behavioral and behavioral-environmental strategies, electrical or biofeedback interventions, light-related approaches, massage, and staff-level sleep-support practices. Designs, populations, outcome measures, intervention duration, and feasibility conditions were markedly heterogeneous. Nonpharmacological sleep care in advanced illness is better characterized as a context-sensitive portfolio than as a single therapeutic pathway. Evidence supports continued evaluation of selected behavioral, physical, light-related, and integrative approaches, while the organizational conditions under which sleep is protected at night remain comparatively under-studied. Integrative palliative nursing therefore requires simultaneous attention to patient-defined priorities, treatment burden, symptom instability, timing, environment, and care-delivery routines.

Keywords: Advanced illness, Palliative nursing, Sleep disturbance, Circadian rhythm, Nonpharmacological intervention, Night-time care

Introduction

Sleep disturbance is a clinically important but variably characterized problem in advanced cancer. Difficulties with sleep initiation, maintenance, continuity, daytime restoration, and sleep–wake timing can coexist with pain,

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dyspnoea, fatigue, emotional distress, medication exposure, treatment effects, and progressive functional decline [1]. Palliative-care assessment is consequently complicated by fluctuating disease burden and by the fact that patients may describe "poor sleep" without fulfilling criteria for a specific sleep disorder [2]. Circadian disruption adds a temporal dimension: weakened or mistimed activity–rest patterns may coexist with insomnia-like complaints, daytime inactivity, nocturnal symptoms, and altered exposure to environmental time cues [3]. Across broader cancer populations, sleep disturbance is common, although prevalence varies substantially with disease stage, measurement instrument, treatment status, and case definition [4]. Sleep and cancer are also connected through multiple behavioral and biological pathways, making simple attribution to either disease or care environment inappropriate [5].

Clinical management therefore begins with differentiation rather than a single treatment assumption. Contemporary cancer-insomnia guidance supports systematic assessment of modifiable contributors, behavioral treatment where appropriate, and attention to clinical context [6]. Evidence syntheses across oncology describe cognitive-behavioral therapy, exercise, mind-body approaches, light-related interventions, acupuncture, complementary therapies, and other nonpharmacological strategies, but the underlying populations are diverse and frequently include survivors or patients receiving disease-directed treatment rather than people with advanced disease [7–9]. Cognitive-behavioral therapy for insomnia has the strongest established behavioral evidence in broader oncology populations, although feasibility and therapeutic priorities may change as illness advances [10]. Interpretation is further complicated by differences between subjective sleep reports and objective or actigraphic outcomes, which need not move in parallel [11].

The palliative-care literature is narrower. Existing synthesis has identified behavioral, environmental and complementary approaches, while also emphasizing limitations in study quantity, design and direct applicability to patients approaching the end of life [12]. Aromatherapy has been evaluated across cancer populations [13], and acupuncture or moxibustion has been synthesized for cancer-related insomnia [14], but neither literature can be transferred automatically to advanced palliative populations. Light-based interventions are particularly relevant to circadian organization because they act through temporal signaling as well as perceived sleep, yet outcomes across cancer studies include fatigue and other symptoms that cannot be treated as interchangeable with sleep quality [15]. Cancer treatments themselves can disrupt sleep, reinforcing the need to avoid assigning nocturnal disturbance to a single behavioral or environmental cause [16]. Even within light-therapy research, effects vary by outcome and study design [17]. Psychosocial and mindfulness-based interventions in advanced cancer provide additional evidence about distress regulation and coping [18], while broader palliative-care reviews locate sleep within multimorbidity and multidimensional symptom management rather than as an isolated endpoint [19]. Exercise likewise represents a plausible sleep-relevant strategy, but tolerability and functional capacity are major boundaries in advanced illness [20].

A previous integrative review of adults with advanced serious illness demonstrated both interest in nonpharmacological sleep interventions and scarcity of directly applicable evidence [21]. Environmental design literature in institutional end-of-life care further suggests that light, sound, privacy, room conditions and patterns of interruption belong within the clinical context of comfort and symptom experience [22]. These observations expose an important conceptual limitation in treating sleep exclusively as a patient-level therapeutic target. In palliative settings, sleep opportunity is partly organized through care: observations, medication administration, continence assistance, symptom reassessment, repositioning, family presence, lighting, sound, staff movement, and responses to deterioration all occur across the same night in which restorative sleep is desired.

The present scoping review therefore maps two connected but analytically distinct evidence domains. The first concerns nonpharmacological strategies delivered to or undertaken by patients. The second concerns the organization and implementation of sleep-supportive practice by palliative-care staff. This separation is necessary because evidence that an intervention changes sleep cannot by itself establish that it can be integrated safely into advanced-illness care, while evidence that nurses regard a practice as feasible cannot establish patient-level efficacy. The review consequently focuses on what has been studied, how interventions and practices have been timed and delivered, where evidence is concentrated, and which clinical and organizational questions remain unresolved.

Review questions

The review used a Population–Concept–Context approach. The population comprised adults with advanced, incurable, or metastatic cancer or comparable advanced serious illness receiving palliative, supportive, hospice, or end-of-life care. Studies of palliative or hospice professionals were also eligible when staff behavior, organizational conditions, education, or bedside practice was directly linked to sleep or circadian care. Existing palliative-specific synthesis confirms that the relevant evidence spans interventions with different theoretical bases and delivery requirements [12].

The concept was defined broadly enough to capture nonpharmacological sleep and circadian care without converting every supportive intervention into sleep treatment. Eligible concepts included behavioral and cognitive-behavioral strategies, environmental modification, light exposure, exercise and mind-body practices,

massage, biofeedback, mindfulness, and other interventions for which sleep, insomnia, sleep–wake function, circadian organization, or a sleep-containing symptom cluster was explicitly evaluated. Aromatherapy [13], acupuncture and moxibustion [14], light-based interventions [15], treatment-related sleep disruption [16], heterogeneous light-therapy outcomes [17], psychosocial interventions [18], broader nonpharmacological palliative symptom management [19], and exercise-based approaches [20] informed the intervention landscape but were not automatically considered primary evidence units in this review.

The first review question was: What nonpharmacological approaches to sleep or circadian disturbance have been empirically studied in adults with advanced illness, and in which populations, settings and temporal contexts have they been evaluated?

The second was: How has the organization of palliative nursing or hospice care been studied in relation to sleep-promoting practices, environmental conditions, staff feasibility, and implementation?

The third was: What boundaries in study design, patient condition, outcome measurement, treatment burden, timing and care setting limit translation of the mapped evidence into integrative palliative nursing?

The questions were deliberately framed for evidence mapping rather than comparative effectiveness. Previous synthesis in advanced serious illness indicates a heterogeneous evidence base that does not justify treating diverse interventions as exchangeable [21]. Environmental end-of-life evidence also indicates that the physical and service environment may matter to patient experience without establishing a direct causal sleep effect [22]. Consequently, intervention findings and organizational findings were charted separately before being interpreted together.

The eligibility boundaries used in the review are summarized in **Table 1**.

Table 1. Population–concept–context boundaries for mapping nonpharmacological sleep and night-time care evidence

Eligibility dimension	Included	Excluded or treated as contextual evidence	Interpretive purpose
Population	Adults with advanced, incurable or metastatic cancer or comparable advanced serious illness	Survivorship-only or early-stage populations without an advanced-illness subgroup	Preserve applicability to palliative illness
Professional population	Palliative or hospice nurses and other staff when sleep-related practice or implementation was directly studied	General staff education with no sleep/circadian relevance	Capture organization of care without inflating patient evidence
Concept	Nonpharmacological intervention with explicit sleep, insomnia, sleep–wake, circadian, or sleep-containing symptom-cluster relevance	Pharmacological-only treatment	Maintain the review's nonpharmacological focus
Organizational concept	Sleep-supportive bedside practice, environmental management, staff feasibility, barriers, education or implementation	Generic staffing or organizational studies unrelated to sleep	Identify night-time-care evidence
Context	Palliative, hospice, supportive, end-of-life, advanced-cancer and closely related advanced-illness settings	Settings without a defensible advanced-illness connection	Protect clinical transferability
Evidence unit	Primary empirical quantitative, qualitative, mixed-method, feasibility, implementation or intervention study	Reviews, guidelines, editorials and protocols as included evidence units	Keep selection counts distinct from background references
Outcome/phenomenon	Sleep quality, insomnia, sleep disturbance, sleep–wake function, circadian organization or directly related implementation phenomenon	Intervention studies with no sleep-related measurement or substantive sleep-care phenomenon	Prevent post hoc expansion of scope
Publication window	2017–2024	Publications outside the prespecified window	Maintain a reproducible evidence horizon
Journal prestige	Not an eligibility criterion	Exclusion solely because a study appeared outside a Q1 journal	Avoid substituting journal rank for evidence appraisal

Materials and Methods

The review followed contemporary JBI guidance for scoping reviews [23] and was reported according to PRISMA-ScR [24]. A scoping approach was selected because the objective was to characterize the range, design, context and interpretive boundaries of heterogeneous evidence rather than calculate a pooled intervention effect. Guidance distinguishing scoping from systematic effectiveness reviews supported this choice [25]. Additional PRISMA-ScR reporting guidance informed documentation of the identification, screening, eligibility and inclusion stages [26].

Eligibility and evidence-unit definition

Eligibility followed the Population–Concept–Context boundaries in Table 1. Adult advanced-illness evidence was prioritized. Patient-level studies were eligible when a nonpharmacological intervention or separable nonpharmacological component was examined and a sleep-related outcome or phenomenon was explicitly present. Staff-level studies were eligible when they investigated bedside sleep-promoting practice, organizational barriers or facilitators, or implementation of sleep-related education in palliative or hospice care.

Primary empirical evidence included randomized and non-randomized intervention studies, pilot or feasibility studies, prospective comparative studies, directly relevant qualitative investigations, descriptive professional surveys, and implementation or educational evaluations. Secondary reviews and clinical guidance were retained as contextual references but were not counted among included review evidence units.

No journal-quartile restriction was applied to review eligibility. Methodological limitations were handled through design-sensitive interpretation rather than exclusion by journal prestige. Studies were not excluded solely because they lacked an effectiveness design: qualitative, survey and implementation evidence could answer the organizational component of the review, provided that its claims were restricted to the phenomena actually measured.

Search strategy and record management

A reproducibility search was conducted on 21 October 2026 with eligibility frozen to publications appearing from 1 January 2017 through 31 December 2024. Search concepts combined terms for advanced cancer or advanced serious illness, palliative or hospice care, sleep or insomnia, sleep–wake or circadian disturbance, and nonpharmacological or nursing-relevant interventions. Intervention-specific expansions included cognitive-behavioral strategies, exercise, Tai Chi, massage, bright light, biofeedback, mindfulness, environmental modification, noise, night-time care and nursing.

The core search logic was:

(advanced cancer OR incurable cancer OR advanced serious illness OR palliative care OR hospice OR end of life) AND (sleep OR insomnia OR sleep disturbance OR sleep-wake OR circadian) AND (nonpharmacological OR nursing OR intervention OR cognitive behavioral OR exercise OR Tai Chi OR massage OR bright light OR biofeedback OR mindfulness OR environment OR noise OR nighttime OR night-time).

Bibliographic discovery was supplemented by exact-title, DOI, reference-list and citation-chaining checks. Records encountered through overlapping routes were entered into one master record set and deduplicated using DOI as the primary identifier and normalized title and publication year as secondary identifiers. Exact-title or DOI verification of an already captured citation did not create an additional evidence record.

Screening and study selection

The master capture contained 50 records. Eight duplicate records were removed. Nine additional records were removed before title/abstract screening because their publication years fell outside the locked 2017–2024 window, leaving 33 records for title/abstract screening.

At title/abstract screening, 13 records were excluded: four lacked an eligible sleep, circadian or night-time-care construct; three examined pharmacological-only interventions; two were protocols, abstracts or non-empirical reports without eligible primary results; two were clearly outside the advanced-illness or palliative context; and two were identifiable secondary reviews rather than primary empirical evidence.

Twenty reports were sought for full-text assessment, all of which were retrieved. Six were excluded after full-text review: three because the population or clinical context did not satisfy the advanced-illness/palliative eligibility boundary, one because the study population was pediatric, and two because they were secondary syntheses rather than primary empirical evidence. Fourteen empirical evidence units remained.

The complete selection arithmetic is shown in **Figure 1**.

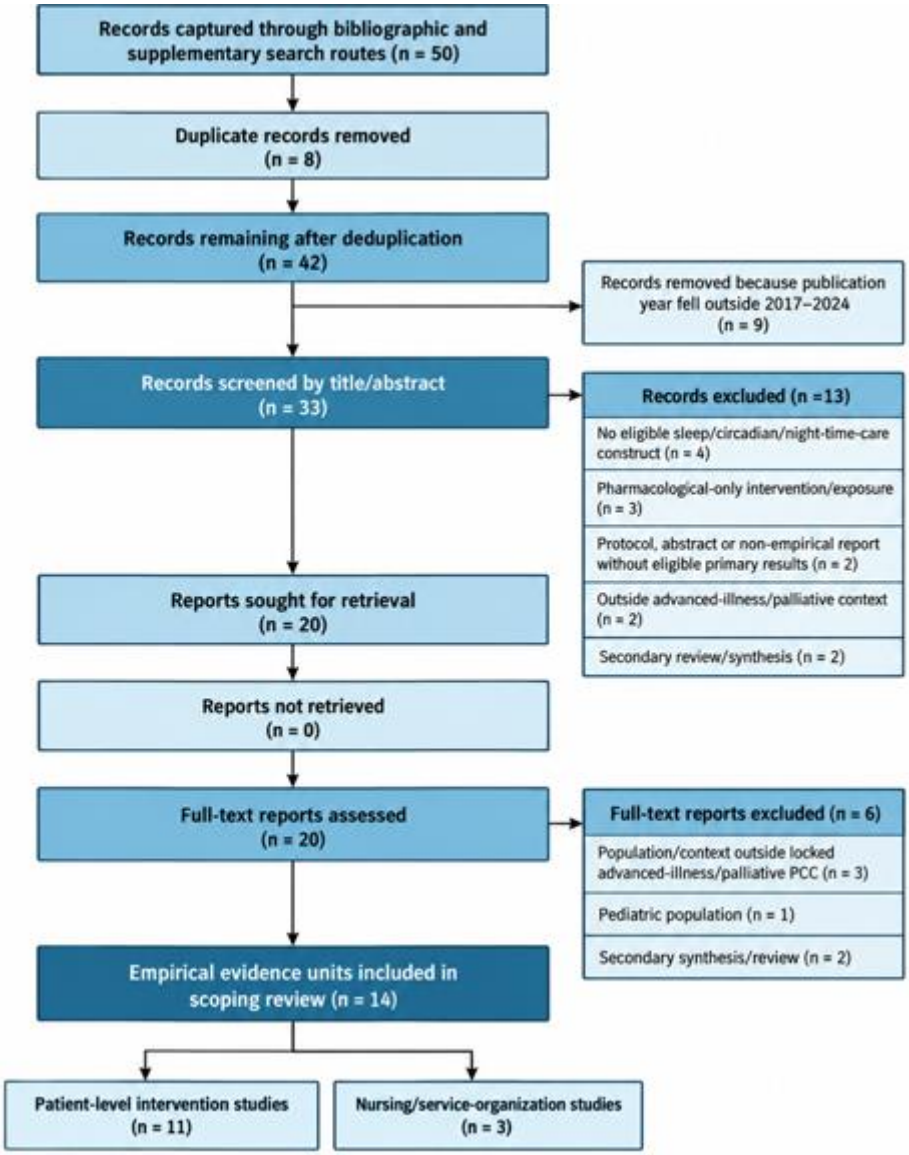


Figure 1. PRISMA-ScR flow of evidence selection for nonpharmacological sleep and night-time care in advanced illness

Charting and synthesis

For every included evidence unit, the extraction process recorded study design, clinical or organizational setting, geographic context, patient or professional population, sample size where reported, intervention or practice, comparator where relevant, measurement source, sleep or circadian outcome, intervention timing, main findings, contrary or null findings, feasibility considerations, authors' limitations, and applicability boundaries.

No pooled effect estimate was calculated. Patient-level intervention evidence and staff/service-organization evidence were initially mapped separately because they answer different questions. Randomized studies could support trial-specific comparative findings; feasibility and pilot studies were interpreted primarily as evidence of deliverability and preliminary signal; uncontrolled studies supported association or feasibility rather than causal effectiveness; and qualitative, survey and educational studies were restricted to experience, acceptability, barriers, facilitators or implementation. This design-sensitive synthesis prevented organizational evidence from being misrepresented as therapeutic efficacy.

Results and Discussion

Evidence-selection flow

Fourteen empirical evidence units met the final eligibility criteria. Eleven evaluated patient-level nonpharmacological interventions, while three examined staff experience, nursing feasibility, organizational barriers, or sleep-related professional education. The evidence base was therefore dominated by patient-directed

intervention research, but the presence of three organizational studies permitted separate examination of how palliative staff perceive and operationalize sleep-promoting care.

The included patient-level literature began with comparative or preliminary studies of exercise, electrical stimulation and behavioral symptom management. A comparative study of medical Qigong and standard exercise in advanced cancer provided evidence that structured physical or mind-body activity can be delivered in this population, while remaining too small and heterogeneous to establish a definitive sleep-specific hierarchy [27]. Cranial electrotherapy stimulation was examined in advanced cancer as a preliminary approach to depression, anxiety, pain and sleep disturbance; its design supports feasibility and longitudinal symptom observation more strongly than causal efficacy [28]. A randomized cognitive-behavioral strategies trial addressed the linked cluster of pain, fatigue and sleep disturbance in advanced cancer, demonstrating the importance of examining sleep within a multidimensional symptom context rather than assuming that a cluster intervention produces an isolated insomnia effect [29].

The first included organizational study shifted the unit of analysis from the patient to bedside care. Hospice and end-of-life staff described nonpharmacological approaches to sleep and circadian disruption that included attention to environmental conditions and everyday care practices [30]. This evidence is directly relevant to how sleep opportunity is created or disrupted, but it does not demonstrate that changing a routine improves patient sleep. A small community palliative-care feasibility study subsequently evaluated a combined cognitive-behavioral and environmental approach to sleep–wake difficulties [31]. Its very small sample and heterogeneous responses make feasibility more defensible than effectiveness as the primary inference. A pilot randomized study of symptom-cluster management provided further behavioral evidence while retaining the uncertainty inherent in small preliminary trials [32].

Professional feasibility was examined directly in a survey of palliative-care nurses. The study demonstrated that nurses could identify numerous nonpharmacological sleep-promoting approaches, while perceived value, institutional support and implementation conditions influenced whether strategies were considered workable in practice [33]. These findings make organizational feasibility visible as an evidence domain in its own right: an intervention may be clinically plausible yet difficult to integrate into night-time care.

A factorial feasibility study of sleep disturbance in advanced cancer combined bright light with pharmacological components, including melatonin and methylphenidate [34]. For the present review, only the separable nonpharmacological bright-light component was relevant to the intervention map. This distinction was important because the effect of the complete multimodal package cannot be attributed to light alone. Staff-facing evidence also included an online sleep-regulation educational intervention designed for palliative-care professionals [35]. Its contribution concerns acceptability, usability and implementation-oriented learning rather than demonstration of improved patient sleep.

More recent patient-level evidence expanded the range of directly tested interventions. Bright-white-light therapy was examined in patients receiving palliative cancer care and produced sleep- and fatigue-related improvements within the studied setting [36]. Home-based heart-rate-variability biofeedback was evaluated in patients with incurable cancer and provided short-term evidence for improvement in selected sleep outcomes, while not establishing durable benefit across all measures [37]. A seven-arm randomized massage trial evaluated different massage doses in palliative cancer care and found dose-related differences across a symptom cluster including pain, fatigue and sleep disturbance; because sleep was embedded in a cluster, the study does not justify a universal sleep-specific massage prescription [38].

A larger randomized clinical trial compared aerobic exercise and Tai Chi with a control condition in advanced lung cancer and identified clinically relevant sleep improvements in the active intervention groups, with particularly strong study-specific findings for Tai Chi [39]. Applicability remains constrained by diagnosis, exercise capacity and ability to participate in a sustained program. Finally, a pilot mindfulness trial involving adults with advanced cancer and family caregivers supplied important conditional evidence: mindfulness can be studied within this population and may affect psychosocial outcomes, but the study does not establish mindfulness as an effective sleep treatment where a distinct sleep benefit was not demonstrated [40].

Characteristics and distribution of the included evidence

The 14 evidence units were heterogeneous in design and purpose. Randomized trials constituted an important part of the patient-level evidence but were accompanied by feasibility studies, preliminary interventions, pilot trials, qualitative staff work, descriptive nursing research and professional education. Cancer dominated the evidence base, and several studies focused specifically on advanced cancer rather than advanced illness more broadly. This concentration restricts direct extrapolation to advanced heart failure, progressive neurological disease, end-stage respiratory disease, multimorbidity and other palliative populations.

Interventions were also heterogeneous in their treatment burden and temporal structure. Some required repeated exercise or mind-body sessions; some relied on short daily light exposure; some involved home practice or device-supported self-regulation; and massage required repeated direct care contact. Behavioral-environmental interventions often depended on cognitive engagement and maintenance of new routines. Consequently, the

simple label "nonpharmacological" concealed clinically important differences in energy demand, staff time, equipment, treatment duration, caregiver involvement and compatibility with progressive functional decline. **Table 2** summarizes the included evidence without treating design types as equivalent.

Table 2. Characteristics and interpretive boundaries of the 14 included evidence units

Evidence unit	Design	Population/ context	Intervention or organizational focus	Sleep-related evidence	Principal interpretation boundary
Medical Qigong versus standard exercise	Prospective comparative intervention	Advanced cancer	Qigong and conventional exercise	Sleep-related symptom/QOL assessment	Small cohort; no definitive sleep-treatment hierarchy
Cranial electrotherapy stimulation	Preliminary prospective intervention	Advanced cancer	Electrical stimulation	Sleep quality assessed with broader symptom outcomes	Uncontrolled preliminary design
Cognitive-behavioral symptom-cluster intervention	Randomized trial	Advanced cancer	Brief cognitive-behavioral strategies	Sleep embedded with pain and fatigue	Cluster response cannot be converted to isolated insomnia efficacy
Hospice/end-of-life staff experience	Qualitative organizational study	Hospice/end-of-life care	Environmental and bedside sleep/circadian practices	Staff-described sleep-support approaches	No patient-level effectiveness outcome
Behavioral-environmental sleep-wake intervention	Feasibility intervention	Community palliative cancer care	Cognitive-behavioral plus environmental strategies	Subjective and objective sleep-related assessment	Very small feasibility sample
Pilot symptom-cluster intervention	Pilot randomized trial	Advanced cancer	Behavioral/acceptance-oriented symptom management	Insomnia/sleep within symptom assessment	Preliminary precision and power
Palliative-nurse practice survey	Descriptive cross-sectional study	Palliative nursing	Feasibility, barriers and facilitators for sleep-promoting practices	Professional perceptions of sleep-support strategies	Perceived feasibility is not implementation or efficacy
Multimodal sleep intervention	Randomized factorial feasibility study	Advanced cancer with poor sleep	Bright light within a package also containing pharmacological components	Sleep-quality and related outcomes	Nonpharmacological component must be separated from drug effects
Sleep-regulation staff education	Descriptive implementation evaluation	Hospice/palliative professionals	Online sleep-regulation education	Acceptability and usability	No direct patient sleep outcome
Bright-white-light intervention	Randomized trial	Palliative cancer care	Morning bright light	Sleep quality and fatigue	Context-specific; does not establish universal circadian treatment
HRV biofeedback	Randomized open-label study	Incurable cancer	Home biofeedback/resonant breathing	Short-term subjective/objective sleep outcomes	Short duration and measure-specific response
Massage dose-response	Seven-arm randomized trial	Palliative cancer care	Repeated massage at different doses	Sleep disturbance within symptom cluster	Cluster outcome and delivery burden limit sleep-specific prescription
Aerobic exercise and Tai Chi	Randomized clinical trial	Advanced lung cancer	Aerobic exercise or Tai Chi	Sleep-quality outcomes	Requires sufficient functional capacity; diagnosis-specific

Mindfulness intervention	Pilot randomized trial	Advanced cancer patient–caregiver dyads	Mindfulness	Sleep-related evidence secondary to wider psychosocial outcomes	Does not establish sleep-specific efficacy

Intervention categories

For descriptive mapping, the evidence was assigned to six non-overlapping categories according to its principal empirical focus. Three studies were grouped as exercise, mind-body or mindfulness interventions; three as cognitive-behavioral or behavioral-environmental symptom management; two as electrical stimulation or biofeedback approaches; two as circadian or light-containing intervention studies; one as massage; and three as nursing or service-organization evidence. These categories are organizational devices for mapping and are not comparative effectiveness rankings.

The intervention literature showed a recurring tension between therapeutic structure and palliative flexibility. Exercise, Tai Chi and some behavioral interventions require participation over repeated sessions and therefore presuppose sufficient functional capacity. Bright-light interventions may be less physically demanding but remain dependent on timing, tolerability and the patient's daily pattern. Biofeedback depends on engagement with technique or equipment. Massage can reduce self-management demands but increases care-delivery time and interpersonal contact. Cognitive-behavioral and environmental approaches may allow greater adaptation yet can become burdensome if delivered as rigid insomnia protocols in patients experiencing unstable symptoms or rapidly changing goals.

These differences also mean that "nonpharmacological" should not be used as a synonym for low burden or universally safe implementation. The relevant burden may be physical, cognitive, temporal, relational or organizational. The included studies did not supply a common metric capable of ranking these burdens against sleep benefit.

Organization and timing of night-time care

The organizational evidence base was much smaller than the patient-intervention literature. Staff accounts showed that sleep-supportive care may involve control of light and sound, reduction of unnecessary disturbance, attention to routines and coordination of bedside activity. Nursing survey evidence further showed that perceived feasibility depends on institutional support and whether sleep-promoting care is valued within routine practice. Professional education research demonstrated that sleep-regulation concepts can be introduced to palliative staff, but patient-level benefit from such education remains unestablished.

This evidence gap is important because many palliative-care sleep disruptions occur in circumstances where routine insomnia treatments cannot fully address the problem. A patient may be awakened because analgesia is required, dyspnoea worsens, continence care cannot be deferred, pressure-area care is necessary, or clinical deterioration requires observation. Conversely, some disturbance may arise from modifiable scheduling, environmental light, avoidable noise, fragmented task organization or routines that are insufficiently individualized. The current evidence does not quantify how often each mechanism occurs or establish a universal rule for consolidating night-time nursing care.

The mapped studies therefore support a distinction between necessary clinical interruption and potentially modifiable interruption, but this distinction remains an interpretive synthesis rather than a validated classification. Patient preference also changes its meaning. Some patients may prioritize uninterrupted sleep; others may prefer frequent reassurance, symptom reassessment, toileting assistance, family presence, or specific timing of care. Sleep preservation cannot therefore be assumed to outrank comfort, safety or patient-defined priorities.

Evidence gaps emerging from the map

Four gaps were particularly visible. First, evidence was concentrated in cancer, limiting confidence about transfer to other advanced illnesses. Second, studies used heterogeneous sleep measures, ranging from broad symptom ratings and sleep-quality questionnaires to objective measures, making apparently similar findings difficult to compare. Third, follow-up was usually short relative to the changing trajectory of advanced illness. Fourth, the literature evaluating staff and care organization was substantially less developed than the literature evaluating patient-level interventions.

The review also identified a causal-inference boundary. Randomized trials can support intervention-specific comparisons within their populations, but several included studies were preliminary, feasibility-oriented or symptom-cluster based. Staff surveys and qualitative evidence answer questions about perceived practicality, barriers and bedside experience, not therapeutic effectiveness. Likewise, a multimodal trial cannot be interpreted as evidence that each component produced the observed result. These distinctions were retained rather than smoothing the evidence into a single efficacy narrative.

Taken together, the Results show that nonpharmacological sleep care in advanced illness is an empirically active but fragmented field. Several intervention families have been tested, including in randomized designs, yet applicability depends strongly on disease context, functional capacity, intervention burden and measurement choice. Evidence concerning how nurses and services organize the night is smaller and primarily implementation-oriented. The implications of this imbalance for integrative palliative nursing are considered in the Discussion.

Results and Discussion

This scoping review identified a heterogeneous but clinically relevant body of evidence on nonpharmacological sleep and circadian care in advanced illness. The mapped literature does not support a single preferred intervention pathway. Instead, it shows several intervention families whose applicability depends on disease stage, functional capacity, symptom burden, treatment burden, timing, patient preference, and the practical organization of care. This pattern is consistent with the broader observation that sleep disturbance in advanced cancer is multidimensional and difficult to separate from pain, fatigue, psychological distress, treatment effects, and circadian disruption [1]. Palliative sleep assessment therefore remains inseparable from the wider clinical context in which sleep disturbance occurs [2].

The strongest direct evidence in the included cohort came from randomized studies of specific interventions, including bright light, massage, exercise, Tai Chi, behavioral strategies, and biofeedback [36–39]. Even within these studies, however, interpretation was constrained by diagnosis, outcome selection, short follow-up, intervention burden, and the frequent use of sleep as one element within a broader symptom cluster. The massage study, for example, examined pain, fatigue, and sleep disturbance together [38]. Similarly, behavioral trials in advanced cancer did not consistently isolate sleep as an independent therapeutic endpoint [29]. These design features do not invalidate the findings, but they limit claims about intervention-specific sleep effectiveness.

Bright-light evidence illustrates another important boundary. Light exposure is biologically relevant to circadian organization and has been studied in advanced cancer [34, 36]. Yet the evidence is not interchangeable across studies. In one factorial feasibility design, bright light was embedded within a multimodal package that also contained pharmacological components [34]. In another trial, bright-white light was directly compared with a dim-light condition in patients receiving palliative cancer care [36]. The former cannot support attribution of the total treatment effect to light alone, whereas the latter provides more direct intervention-specific evidence within its studied population.

Exercise and mind-body approaches showed similarly conditional applicability. Tai Chi and aerobic exercise produced favorable sleep-related findings in advanced lung cancer [39], while earlier exercise and Qigong evidence demonstrated feasibility in selected advanced-cancer participants [27]. These approaches may be attractive for patients who retain sufficient mobility and stamina, but they are less readily transferable to patients with rapid functional decline, severe dyspnoea, uncontrolled pain, delirium, or profound fatigue. Mindfulness-based work also demonstrates the distinction between feasibility and sleep-specific efficacy. Although mindfulness can be delivered to adults with advanced cancer and their caregivers, a study that primarily supports psychosocial feasibility cannot be converted into evidence of a specific sleep-treatment effect [40].

The organizational evidence was much thinner. Staff experience, nursing surveys, and professional education studies showed that sleep-supportive care depends partly on the conditions under which nursing work is delivered [30, 33, 35]. Nurses may recognize strategies such as minimizing noise, controlling light, consolidating avoidable interruptions, or adapting routines to patient preference, yet implementation depends on workload, institutional norms, available resources, and competing clinical obligations. This evidence is particularly important because sleep disruption at night is not always modifiable. Symptom escalation, continence needs, medication administration, pressure-area care, or clinical deterioration may justify interruption. The relevant clinical problem is therefore not simply how to reduce nocturnal care, but how to distinguish necessary care from avoidable disruption.

This distinction has implications for integrative palliative nursing. Sleep protection should not be treated as an isolated goal that overrides comfort, safety, or the patient's own priorities. A patient may prefer repeated reassurance or timely symptom treatment even when these fragment sleep. Conversely, another patient may consider uninterrupted rest a major goal and prefer nonurgent care to be consolidated. Individualized night-time care therefore requires explicit attention to what the patient values at that stage of illness.

The review also identified methodological limitations. Cancer dominated the included evidence, which narrows transferability to noncancer palliative populations. Outcome measures varied substantially, with studies using subjective sleep-quality instruments, symptom-cluster ratings, insomnia measures, and objective or actigraphic assessments. Subjective and objective sleep measures may not respond identically [11]. Follow-up was often short, and many studies were feasibility-oriented. These characteristics reinforce the appropriateness of evidence mapping rather than pooled effectiveness estimation.

A further limitation arises from the separation between intervention research and organizational research. Patient-level trials can establish whether a defined intervention changes an outcome under study conditions, but they

provide little information about whether nurses can integrate the intervention into routine night-time care. Organizational studies provide the reverse: they illuminate feasibility, barriers, and bedside practice without establishing therapeutic effectiveness. The most important evidence gap may therefore lie at the intersection of these two domains.

Implications for practice and research

Current evidence supports a cautious, individualized approach to nonpharmacological sleep care in advanced illness. Palliative nurses can consider environmental modification, behavioral support, light exposure, relaxation or biofeedback strategies, exercise or mind-body practices, and selected integrative interventions when these are compatible with the patient's goals and condition. The evidence does not justify treating any one approach as universally preferred.

In practice, the first decision should concern compatibility with the patient's current state. Interventions requiring sustained activity, cognitive engagement, repeated practice, or equipment may be inappropriate when symptom burden is high or functional capacity is declining. Other strategies, including environmental adjustments or selected bedside interventions, may impose less self-management burden but can still require staff time and coordination.

Table 3 summarizes the intervention categories in terms of their practical characteristics rather than ranking effectiveness.

Table 3. Nonpharmacological sleep-care categories mapped by delivery demands and palliative applicability

Intervention category	Typical mode of delivery in the mapped evidence	Main practical requirement	Potential advantage in advanced illness	Principal applicability limit
Behavioral and cognitive-behavioral strategies	Structured patient participation and repeated practice	Cognitive engagement and continuity	Can address routines, coping and sleep-related behavior	May be burdensome during rapid deterioration or severe symptoms
Environmental sleep-support strategies	Adjustment of light, noise, routines and bedside conditions	Staff coordination and environmental control	Low pharmacological burden and adaptable to preference	Effectiveness is poorly isolated from broader care context
Bright-light/circadian approaches	Timed exposure to bright light	Correct timing, tolerability and access to equipment	Directly targets circadian signaling	Timing and response are context dependent
Exercise and Tai Chi	Repeated structured activity	Mobility, stamina and participation	May address sleep together with physical and psychological well-being	Limited applicability in severe functional decline
Biofeedback and self-regulation	Guided home or clinical practice	Engagement with technique/device	Potentially low medication burden	Evidence remains short-term and setting specific
Massage and hands-on supportive approaches	Repeated therapist or caregiver-delivered sessions	Staff time, touch tolerance and delivery capacity	Low cognitive demand for the patient	Resource intensity and symptom-cluster evidence complicate sleep-specific interpretation
Mindfulness and related mind-body approaches	Guided sessions and home practice	Attention and repeated participation	May address distress alongside sleep-related concerns	Sleep-specific benefit is not consistently established

Night-time nursing organization should also be treated as an intervention context in its own right. A practical objective is not to eliminate nocturnal care, but to reduce preventable disturbance while preserving necessary symptom management and safety. When clinically feasible, this may involve coordinating nonurgent tasks, limiting avoidable light and sound, aligning care with the patient's preferred sleep period, and reviewing whether habitual routines remain necessary.

Table 4 distinguishes practice implications from unresolved evidence requirements.

Table 4. Nursing implications and unresolved evidence gaps in night-time sleep care

Practice or research issue	What the mapped evidence supports	What remains uncertain	Priority for future work
Patient-defined night-time priorities	Sleep-supportive care should be individualized	How preferences change across illness trajectory	Repeated preference assessment in longitudinal studies
Environmental light and sound	These are plausible modifiable contributors to sleep opportunity	Magnitude of benefit in advanced illness	Pragmatic trials embedded in palliative units
Consolidation of night-time care	Avoidable interruptions may be modifiable	Which interruptions can be safely deferred	Workflow and implementation studies
Bright-light use	Direct intervention evidence exists in selected palliative populations	Optimal timing, dose and applicability outside cancer	Advanced-illness-specific circadian trials
Exercise and mind-body approaches	Selected ambulatory patients may benefit	Feasibility in severe functional decline	Stratification by performance status
Massage and hands-on interventions	Symptom-cluster benefits have been studied	Sleep-specific contribution and service burden	Comparative implementation research
Behavioral and self-regulation approaches	Feasibility and preliminary benefit are documented	Adaptation for cognitive, functional or symptom instability	Flexible palliative-adapted protocols
Staff education	Sleep-regulation education is acceptable to palliative professionals	Whether education changes bedside behavior or patient outcomes	Implementation trials linking staff learning to patient-level measures
Outcome measurement	Multiple sleep measures are available	Lack of standardization limits comparison	Core outcome sets combining patient-reported and objective measures
Noncancer palliative illness	Evidence is sparse	Transferability beyond advanced cancer	Inclusion of cardiac, respiratory, neurological and multimorbidity populations

Future research should connect patient-level interventions with the service conditions required for implementation. Pragmatic trials in palliative-care settings should record not only sleep outcomes but also functional status, symptom burden, treatment burden, timing of delivery, patient preference, staff workload, adherence, and reasons for discontinuation. Organizational studies should move beyond whether nurses regard interventions as feasible and examine whether altered care routines change patient experience without compromising symptom control or safety.

A second priority is temporal specificity. Circadian interventions cannot be interpreted adequately without documenting when exposure or activity occurs. Similarly, night-time nursing research should distinguish interruptions occurring early in the night, during the main sleep period, or toward morning. This would allow future studies to examine whether timing modifies tolerability or benefit.

The conceptual relationship emerging from the review is shown in **Figure 2**.

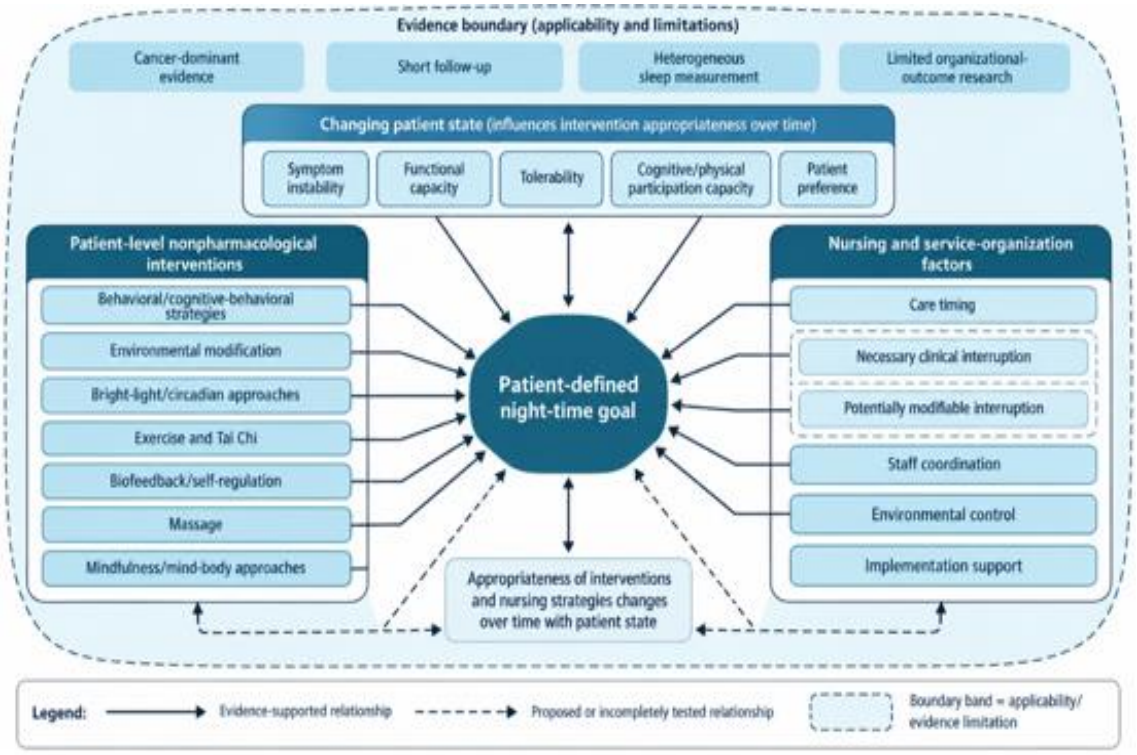


Figure 2. Integrating nonpharmacological sleep interventions with patient state and night-time nursing organization in advanced illness

Conclusion

Sleep and circadian disturbance in advanced illness are addressed by a diverse but uneven body of nonpharmacological evidence. Several behavioral, physical, light-related, biofeedback, massage and mind-body approaches have been tested, but their applicability depends on patient condition, treatment burden, timing, setting and individual priorities. Evidence concerning the organization of night-time nursing care is substantially less developed than patient-level intervention research.

The central implication is that sleep protection in palliative care should be individualized and integrated with symptom management rather than treated as an isolated therapeutic objective. Necessary clinical interruptions cannot be eliminated, but potentially modifiable environmental and organizational disturbance deserves more direct investigation. Future research should connect intervention effectiveness with implementation, patient preference, temporal context and real-world nursing workflow so that sleep-supportive care can be delivered without compromising comfort, safety or patient-defined goals.

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