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Sensory Burden as a Limit to Integrative Nursing Care: A Conceptual Framework for Coordinating Touch, Sound, Light, and Bedside Activity in Adults with Advanced Illness

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Abstract

To examine sensory burden as a potential limit to otherwise beneficial integrative nursing care in adults with advanced illness and to develop a conceptual basis for coordinating touch, sound, light and bedside activity without imposing universal sensory thresholds. Patients with advanced illness may simultaneously experience fatigue, disturbed sleep, pain, psychological distress and changing preferences for interaction. Nursing care, family presence and supportive nonpharmacological interventions can be beneficial, yet each may also contribute sensory input. Existing literature commonly considers noise, light, touch or individual interventions separately, leaving the combined experiential consequences of overlapping bedside activity insufficiently conceptualised. Original non-empirical conceptual framework developed through critical integration of nursing, palliative-care, oncology, environmental and supportive-care scholarship. Peer-reviewed literature published from 2017–2024 was selected for direct or conceptually relevant evidence concerning sensory environments, fatigue, sleep, patient preferences, touch-related care, nonpharmacological nursing interventions, multidimensional assessment and bedside workflow. Sensory burden is proposed as a patient-specific and temporally variable state arising when multimodal environmental and care-related stimulation exceeds what a person can comfortably integrate at a particular point in illness. The concept distinguishes sensory burden from stimulus intensity alone and from the assumption that lower stimulation is always preferable. Coordinated nursing care therefore requires attention to cumulative exposure, the purposes of individual care activities, changing patient tolerance and competing clinical or relational requirements. Sensory coordination may extend person-centred palliative nursing by making the timing and concurrence of otherwise legitimate bedside activities visible as a clinical consideration. Empirical validation is required before the framework can support measurement thresholds or standardised intervention protocols.

Keywords: Advanced illness, Environmental stimuli, Nursing, Palliative care, Person-centred care, Sensory burden

Introduction

Palliative nursing depends on relationships in which patients can communicate needs, retain meaningful choice and experience care as attentive to the person rather than merely to clinical tasks. Relational connection, engagement and trust are therefore integral to high-quality palliative nursing [1]. Yet the bedside conditions through which such care is delivered are themselves experientially consequential. Physical environments can support or interfere with comfort at the end of life [2], while patients with cancer often experience several symptoms simultaneously rather than as isolated problems [3]. The practical implication is that a care encounter may occur against a background of fatigue, pain, sleep disruption, distress and changing capacity for engagement.

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Patient priorities are also heterogeneous. Older people with life-limiting illness do not assign identical value to the same care attributes [4], and oncology populations display distinct patterns of concurrent symptom burden [5]. These findings caution against treating tolerance for interaction or environmental stimulation as fixed. In this paper, sensory burden denotes a proposed patient-experienced state in which the combined sensory demands of the environment and bedside care become difficult to integrate at a particular time. It is not a numerical exposure score, a synonym for noise, or an assumption that all stimulation is harmful.

The central problem is therefore one of coordination. Touch, conversation, lighting, clinical observation, medication administration, repositioning, personal care, family presence and other bedside activities may each be appropriate or desired. Their value in isolation does not establish that their concurrence will always be tolerable. A conceptual account is needed that preserves the benefits and obligations attached to these activities while asking when their timing, overlap or sensory combination may become burdensome for a particular patient.

Background

Research in complex healthcare environments demonstrates that sensory conditions extend beyond a single environmental variable. Noise, lighting and other characteristics of the physical setting have been associated with patient and staff outcomes, although much of this evidence originates in critical-care environments [6]. Such work is informative for identifying potentially relevant exposure domains but cannot be transferred uncritically to palliative populations, where goals of care, illness trajectories and relational priorities may differ.

Auditory exposure illustrates both the relevance and the limitations of modality-specific evidence. Intensive-care noise has been associated with poorer perceived sleep [7], and concurrent noise and light conditions have also been related to sleep quality [8]. Intervention research suggests that modifying sound or darkness can sometimes improve sleep, but effects differ across intervention components and settings [9]. The defensible inference is therefore not that maximal quiet and darkness constitute an optimal therapeutic state. Sound and light may be disruptive, orienting, reassuring or clinically necessary depending on their source, timing and meaning.

Patient state further complicates interpretation. Fatigue and disturbed sleep commonly coexist among people with cancer [10], and evidence-based management of fatigue in advanced cancer emphasises its multifactorial nature [11]. Clinical trials in advanced cancer likewise demonstrate the salience of substantial fatigue as a symptom requiring focused assessment [12]. Fatigue should consequently be treated as a possible modifier of tolerance rather than evidence that sensory stimulation caused the patient's exhaustion. Pain, anxiety, medication effects, disease progression, sleep disruption and other processes may produce similar apparent reductions in capacity for engagement.

Nursing organisation introduces another layer because environmental stimulation is partly generated through care itself. Hospital nursing practices intended to protect or manage sleep vary between wards and institutions [13], indicating that timing, routines and service organisation can shape when patients experience interruption. This makes bedside activity analytically different from uncontrollable environmental noise: at least some activity is purposeful, clinically indicated or relationally valuable and cannot simply be eliminated.

The resulting distinction is summarised in **Table 1**: sensory exposure becomes clinically meaningful only when its source, patient relevance, concurrence with other demands and interpretive limits are considered together.

Table 1. Sensory exposure conditions that may shape bedside tolerability in adults with advanced illness

Sensory-care domain	Typical bedside manifestation	Patient-relevant consequence to consider	How cumulative burden may arise	Interpretation boundary
Auditory environment	Alarms, equipment, staff conversation, doors, routine activity	Interruption of rest, difficulty concentrating or unwanted arousal	Repeated or simultaneous sounds may occur during periods of fatigue or attempted sleep	Sound may also orient, reassure or enable necessary communication
Light and visual activity	Overhead lighting, task lighting, screens, room entry and visible movement	Disturbed rest, visual discomfort or difficulty settling	Lighting may coincide with procedures, conversations and movement rather than occurring alone	Illumination may be necessary for safety, orientation or patient preference
Touch and bodily contact	Repositioning, hygiene, examination, massage or supportive touch	Comfort, reassurance, discomfort, fatigue or unwanted bodily intrusion	Several touch-based activities may occur within a short period or during reduced tolerance	Touch cannot be classified as burdensome or therapeutic without patient and clinical context

Movement and proximity	Staff entry, equipment movement, transfers and repeated positioning	Increased alertness, interruption or physical effort	Movement may repeatedly reactivate attention during otherwise quiet periods	Mobility and repositioning may be clinically necessary and beneficial
Relational and care activity	Conversation, assessment, teaching, family presence and supportive interaction	Connection and participation, but also cognitive or emotional demand	Several beneficial interactions can overlap with physical care and environmental stimulation	Reduced activity must not be equated with person-centred care when interaction is wanted

Data sources

The conceptual synthesis draws on an explicitly selected rather than systematically exhaustive evidence set published from 2017–2024. Selection prioritised evidence that could clarify the distinction between individual sensory modalities, patient vulnerability, beneficial sensory care and the organisation of bedside activity. Palliative-care literature was privileged where available, while oncology, hospital and critical-care evidence was retained when it addressed mechanisms or care processes relevant to the conceptual question. Evidence originating outside palliative care is therefore used as contextual support rather than assumed to demonstrate effects in adults with advanced illness.

Touch-related care illustrates why heterogeneous sources are necessary. A systematic review of aromatherapy, massage and reflexology in people with palliative-care needs found heterogeneous evidence and did not justify universal claims of benefit.[14] Qualitative synthesis of patient perspectives similarly showed that experiences and preferences surrounding these therapies vary [15]. Nurse-led nonpharmacological interventions for cancer pain encompass several sensory, behavioural and educational approaches [16], while sleep-intervention research includes changes to noise, light, quiet periods and the timing or minimisation of care activities [17]. Together, these sources show why a sensory-burden framework cannot classify touch, sound or nursing activity as intrinsically harmful. The same modality can have different experiential meanings according to purpose, delivery and patient preference.

The evidence base also requires multidimensional reasoning. Development of a needs-assessment guide for the initial palliative-care encounter identified a broad range of patient and family needs rather than reducing assessment to an isolated symptom domain [18]. Sensory tolerability should therefore be situated within, rather than substituted for, multidimensional palliative assessment. The present synthesis uses environmental studies to identify possible exposures, symptom literature to characterise vulnerability, nursing and intervention studies to examine care-generated stimulation, and palliative-care scholarship to preserve patient preference, relational meaning and clinical context.

This synthesis supports a bounded conceptual representation in which sensory burden depends on the interaction among multimodal bedside exposure, the patient's changing state and the purposes attached to care activities, while uncertainty remains explicit rather than converted into a quantitative threshold **(Figure 1)**.

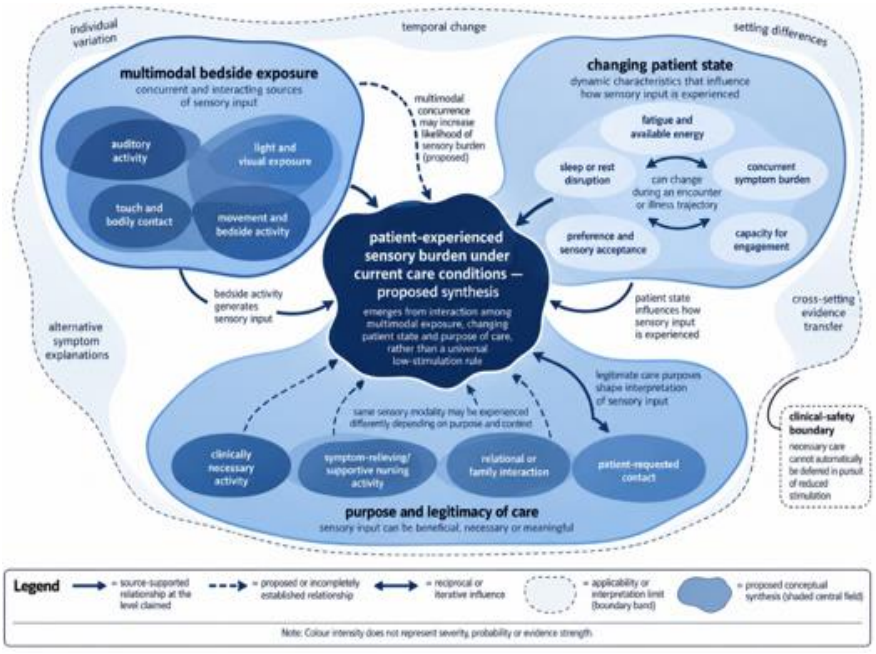


Figure 1. Multidimensional conditions through which bedside sensory exposure may become burdensome in advanced illness

Overview of the issues

Touch, relationship and bodily proximity

Touch demonstrates the inadequacy of treating sensory exposure as inherently negative. Decisions in specialist palliative care are shaped by reciprocal relationships between patients and caregivers, including obligations, preferences and negotiation [19]. Nurses likewise describe nonpharmacological care as dependent on knowing the individual patient and working within practical constraints [20]. Bodily contact may therefore relieve pain, convey reassurance, assist hygiene or positioning, or become tiring and unwelcome. The analytically important question is whether the activity is wanted and tolerable at that moment, not whether touch belongs to a predetermined beneficial or burdensome category.

Environmental activity and overlapping care

Family narratives concerning end-of-life care identify physical environment, staffing and coordination as domains through which care quality is experienced [21]. This suggests that environmental conditions and care organisation should not be separated too sharply. A room may be acoustically quiet yet remain demanding because of repeated entries, physical procedures, conversation and movement. Conversely, a socially active room may be experienced positively when interaction is meaningful and desired. Sensory burden therefore concerns the configuration of activities around the patient rather than environmental intensity alone.

Timing, interruption and opportunities for coordination

Some components of bedside activity are modifiable. A hospital sleep-promotion programme that restructured nighttime practices reduced selected interruptions and room entries [22], while a separate workflow initiative showed that routine nighttime care could be reorganised even though improvements in patient-reported sleep were not uniformly demonstrated [23]. These findings provide a useful boundary for the proposed framework. Coordination may reduce avoidable concurrence, but the benefit of rescheduling cannot be assumed, and clinically necessary observations, symptom treatment, continence care, repositioning or urgent communication retain priority.

Competing goods in person-centred care

A sensory-coordination approach must also resist turning quietness into a competing institutional objective. Systematic evidence from adult intensive care shows that interventions labelled patient- and family-centred do not consistently improve every measured outcome [24]. At the same time, family members in inpatient palliative care describe information, psychosocial support and genuine encounters with professionals as important elements of care [25]. Family presence, conversation and staff engagement can therefore add sensory and cognitive demand while simultaneously serving relational needs that matter deeply to patients and families.

The central nursing problem is consequently not how to eliminate bedside stimulation but how to preserve necessary and valued care while recognising avoidable overlap. **Table 2** translates that distinction into coordination principles without converting them into fixed clinical rules.

Table 2. Coordination principles for overlapping bedside activity under changing sensory tolerance

Coordination focus	Clinical question at the bedside	Potential nursing response	Care value that must be preserved	Boundary preventing overapplication
Patient-defined tolerance	What forms of contact, sound, light or interaction feel welcome or difficult now?	Ask, observe, and revisit preferences as the patient's condition changes	Agency and person-centred participation	Absence of complaint must not automatically be interpreted as tolerance
Temporal spacing	Are several flexible activities occurring within a short interval?	Separate non-urgent activities when clinically feasible and consistent with patient wishes	Rest and reduced interruption	Necessary care must not be postponed solely to create quiet
Purposeful clustering	Would combining selected activities reduce repeated disturbance without creating a prolonged intensive encounter?	Cluster only compatible activities and allow recovery time where required	Efficiency and continuity	Bundling can itself increase burden when too many demands occur together
Meaningful contact	Is family presence, conversation, touch or supportive interaction desired despite adding stimulation?	Protect wanted interaction and adapt other flexible activities around it	Relationship, comfort and identity	Sensory minimisation must not displace valued human contact

Environmental adjustment	Are modifiable sound or lighting conditions contributing to difficulty settling or engaging?	Adjust avoidable environmental input according to patient preference and safety	Comfort and orientation	Darkness or silence is not universally therapeutic
Reassessment	Has fatigue, symptom burden, cognition, alertness or preference changed since the previous encounter?	Re-evaluate tolerability rather than relying on a previous judgement	Responsiveness to illness trajectory	No permanent sensory-tolerance category should be assigned

Conceptual findings

The synthesis supports four linked propositions. First, sensory tolerance is patient-specific rather than a stable characteristic of a stimulus. Preferences for engagement in palliative-care activities vary according to timing, circumstances and the role a person is being asked to assume [26]. Applied to bedside sensation, this means that a sound, touch, conversation or activity cannot be classified as tolerable solely from its physical properties. Its meaning depends partly on whether it is expected, wanted, clinically necessary and compatible with the patient's current capacity to engage.

Second, tolerance is temporally variable. Patients and family caregivers describe uncertainty and changing support needs when moving between care settings [27]. illustrating how illness context and trajectory alter what can be managed at a given time. The same principle is relevant within a hospital day: fatigue, wakefulness, pain, dyspnoea, anxiety, medication effects and recent care activity may change how subsequent stimulation is experienced. Sensory tolerance should therefore be understood as a revisable clinical judgement informed by the patient rather than a permanent patient category.

Third, cumulative exposure is conceptually different from isolated modality effects. A light source, conversation, physical examination or repositioning procedure may be acceptable individually while becoming difficult when several demands coincide or follow each other without sufficient recovery. The proposed construct therefore concerns the experiential configuration of care rather than simple addition of decibels, illumination, touch events or room entries. Patient-reported outcomes used in serious non-cancer illness further demonstrate the importance of obtaining the patient's account of function and experience across diagnoses [28], although such measures do not themselves validate a sensory-burden construct.

Fourth, opportunity for preference expression cannot be equated with reliable knowledge of tolerance. A pilot randomised trial of a question-prompt intervention in outpatient palliative care did not uniformly increase question asking despite creating an explicit opportunity for patient participation [29]. Some patients may be unable, unwilling or too fatigued to state preferences repeatedly. Others may prioritise necessary treatment or family contact despite discomfort. Consequently, the proposed framework requires repeated invitation, observation and interpretation while preserving the legitimacy of non-participation and avoiding assumptions that silence means comfort.

Taken together, these propositions define sensory burden as a proposed, dynamic patient-experienced state produced by the interaction between multimodal bedside exposure, changing tolerability and the purposes attached to care activities. This definition intentionally excludes a universal numerical threshold. Its practical value lies in making concurrence, timing and patient-specific meaning visible as aspects of nursing coordination.

Results and Discussion

The framework extends person-centred palliative nursing by treating the organisation of bedside activity as part of the patient's sensory experience. Future validation should prioritise patient-reported assessment because contemporary palliative-care quality measurement increasingly recognises the importance of outcomes defined from the patient's perspective [30]. Such assessment would need to distinguish sensory burden from adjacent phenomena including fatigue, sleep disturbance, pain, anxiety, delirium and general symptom burden rather than simply re-labelling them.

Implementation also has a service dimension. Palliative work can impose substantial emotional demands on nursing personnel [31], and any coordination approach that requires repeated reassessment, communication among disciplines or modification of routine workflows must therefore be evaluated for feasibility. A framework intended to protect patients from avoidable overload should not generate an additional documentation or surveillance burden that reduces relational time at the bedside.

The practical implication is adaptive coordination rather than sensory minimisation. Environmental modification may sometimes be helpful [9], touch-related interventions may be valued by some patients [14], nursing interventions can themselves involve sensory and cognitive engagement [16], and family presence may be central to psychosocial support [25]. The relevant question is therefore which activities are necessary or meaningful, which are flexible, and whether their timing can be adjusted when the patient indicates reduced tolerance. Night-time workflow research suggests that selected interruptions can sometimes be reorganized [22], while mixed

effects after workflow restructuring caution against assuming that fewer interruptions automatically produce better patient experience [23].
This adaptive relationship is represented in **Figure 2**.

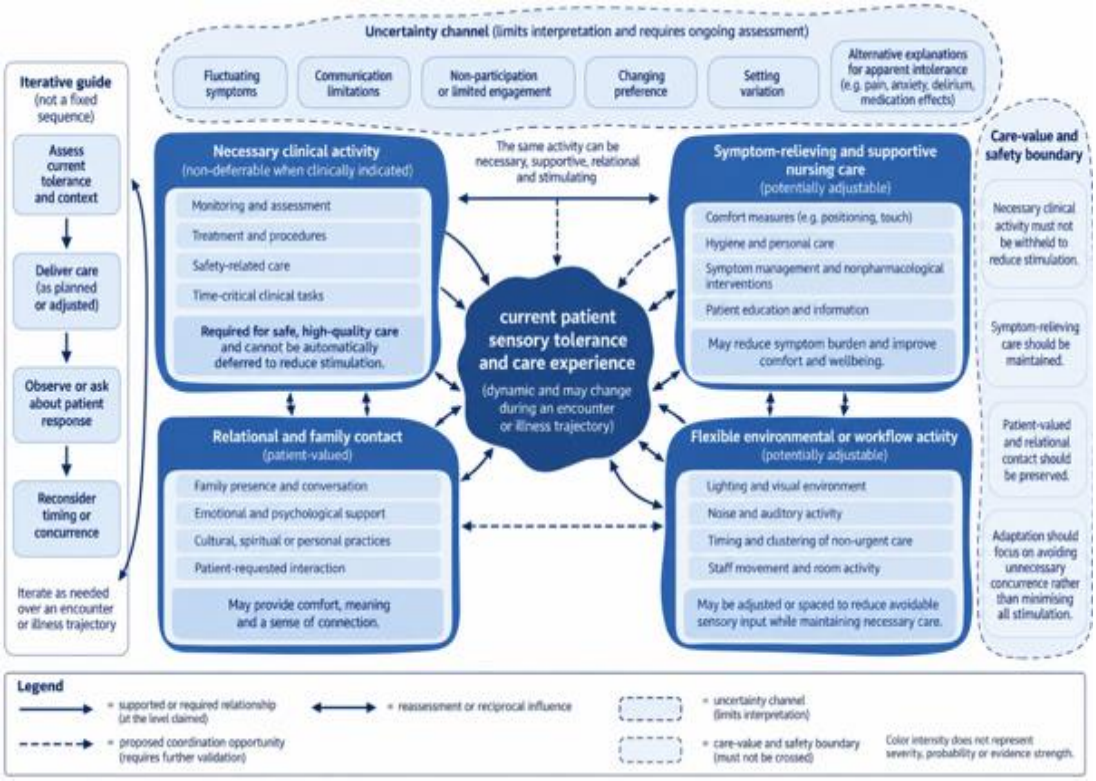


Figure 2. Adaptive coordination of bedside care under changing patient sensory tolerance

The framework has important limitations. Much of the direct sensory evidence comes from intensive-care, oncology or general hospital populations rather than dedicated palliative-care cohorts [6]. Associations between noise, light, sleep and patient outcomes cannot establish a single mechanism of sensory burden, and complementary-intervention evidence remains heterogeneous [14]. Patient-centred approaches also do not consistently improve all measured outcomes [24], reinforcing the need to test rather than assume the benefits of coordination.
Research should therefore establish whether sensory burden is distinguishable from existing symptom constructs; identify language patients and families use to describe cumulative stimulation; examine within-person change across a shift or illness trajectory; and test whether coordinating flexible bedside activities improves experience without delaying clinically important care. Studies should also address people who cannot readily self-report and determine when proxy interpretation is ethically and clinically acceptable. Until such evidence exists, the framework should remain a conceptual aid to noticing and reasoning rather than a scored instrument or prescriptive protocol.

Conclusion

Sensory burden provides a way to examine how touch, sound, light, movement and bedside activity may become difficult to tolerate when they accumulate around adults with advanced illness. Its principal contribution is to shift attention from isolated stimuli toward the interaction between multimodal exposure, changing patient tolerance and the legitimate purposes of care. Person-centred nursing should therefore seek adaptive coordination rather than indiscriminate sensory reduction. The framework remains conceptual and requires empirical validation before numerical thresholds, formal assessment tools or standardised interventions can be justified.

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