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RESEARCH ARTICLE

A nursing perspective on inpatient sleep and circadian disruptions for pediatric stem cell transplant patients

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Abstract

Background: Children treated with stem cell transplant (SCT) are routinely hospitalized for long periods where they are exposed to significant sleep and circadian disruptions. As nurses play a primary role in symptom management during SCT, we sought to understand their perspective on patient sleep and circadian disruptions, perceived barriers to a good sleep and circadian environment, and suggestions for improvement.

Procedure: Four focus groups were conducted with pediatric SCT nurses ($N = 25$ participants). A semistructured focus group guide was administered, with the discussions recorded and transcribed. A multistage thematic analysis combining prefigured and emergent dimensions was conducted. Our analysis focused on drawing comparisons within and across focus groups to understand the unique work experiences that participants had related to the patient's sleep and circadian environment.

Results: Three key themes emerged. First, nurses expressed a high awareness of how disruptive the hospital environment is for patients. Second, nurses described their extensive efforts to try to minimize the impact of these disruptions. Finally, they provided clear recommendations for how to improve upon these concerns, along with barriers that they perceive could impede implementation.

Conclusions: Front-line caregivers on a pediatric SCT unit describe key contributors to sleep/circadian disturbances for patients. Within the constraints of the considerable medical needs of this patient population and the physical room/hospital environment, nurses strive to minimize these disruptions to the best of their ability. It is crucial that hospitals assess and remediate these disturbances for these children that have important implications for overall health.

KEYWORDS
Focus groups, inpatient disruptions, nurse perspective, pediatric stem cell transplant patients, sleep and circadian health

Abbreviations: SCT:, SCT: Stem cell transplant.

1 | INTRODUCTION

Hospitalized pediatric patients experience frequent night wakings, poor sleep quality, short sleep duration, and dysregulated circadian rhythms.[1–4] This is a significant challenge for children undergoing stem cell transplant (SCT) as they are typically hospitalized for extended periods during treatment. The median hospital stay for an SCT patient's initial transplantation admission is 40 days[5] and can reach up to 100 days.[6] As a result, pediatric SCT patients are known to experience many sleep and circadian health problems during inpatient hospitalizations.[7] Poor sleep quality or insufficient sleep has been associated with a decreased ability to fight infection, evidenced by impairments to immune function (e.g., cytokine and neutrophil production).[8–10] Circadian misalignment (abnormal timing between an individual's environmental/behavioral patterns relative to their internal biological clock) has a profound influence across a range of health conditions, including immune dysregulation.[11] Because pediatric SCT patients are already at increased risk for health comorbidities due to their immunocompromised status, it is essential that we better understand sleep and circadian disruptions in the inpatient setting and what can be done to address these critical problems.

Although prior studies have focused on the patient/family and oncologist, one notably overlooked group in this research is nurses. Nurses play an "indispensable role in the care" of children with cancer,[12] providing a "canopy for cancer patients" that shelters them from the sequelae of their disease.[13] Inpatient nurses often take a primary role in symptom management, serving as the first point of contact for helping children and their families feel comfortable during hospitalizations.[14] They are highly effective at helping pediatric oncology patients cope with their medical experience.[15] In multiple studies, it has been demonstrated that nurses are more important than even pediatric oncologists in terms of guiding medical decisions and managing patient health.[16,17]

Despite the important role that nursing staff play in the sleep and circadian environment of children and their families during their inpatient hospitalization, no prior in-depth qualitative research among oncology nurses has been conducted studying this issue. In the current study, we sought to learn from SCT nursing staff about their perceptions of the patient/family experience as it relates to sleep and circadian disruptions, the barriers to a good sleep and circadian environment, and suggestions for how to improve this environment.

2 | METHODS

2.1 | Participants

Focus groups were scheduled during work shifts on weekends in March-April 2023, allowing all of the nursing staff on the unit to be considered/offered participation. Approximately 10 days prior to each focus group, the nurse manager of the SCT unit (JW) sent an email to all eligible bedside nurses scheduled to work on a focus group day, inviting them to participate. The email described the general purpose of the focus group and study-related compensation ($50 gift card). A nurse was eligible for this study if they were working on the SCT unit for at least 10 hours/week and were willing and able to participate in a 45—60-minute focus group. All invited nurses chose to attend. The study was deemed by the hospital IRB as nonhuman subject research.

2.2 | Instrument design and data collection

The principal investigator (ESZ) and one qualitative methodologist (AR) designed a semistructured focus group guide, which was revised based on input from SCT content experts in the fields of nursing and hematology/oncology (JW and LEL) for completeness. The final focus group guide was then reviewed and revised by several team members (ESZ, AR, JW, and LEL). The principal investigator (ESZ), with training and experience in qualitative research, conducted all focus groups. The audio-recordings of the group were transcribed verbatim and deidentified for analyses.

2.3 | Analysis

The principal investigator and qualitative methodologist coded and analyzed transcripts using a multistage thematic analysis that combined prefigured and emergent dimensions.[18–20] We drew on a collaborative approach to codebook development and coding through the inclusion of interdisciplinary voices and team discussions that brought diverse lenses and expertise to the process. Established domains from the interview guide provided the codebook's initial framework. All transcripts were reviewed, and an inductive open-coding approach was then applied, with emergent concepts added to finalize the codebook. NVivo 1.7.1 (QSR International) facilitated coding and analysis. One primary coder (ESZ) was responsible for initially coding all transcripts and did so with the guidance and input of the interdisciplinary team. All of the coding was then reviewed by a coauthor (AR), a qualitative methodologist. Discrepancies were resolved through team discussion. Coded data were reviewed and summarized, and our analysis focused on drawing comparisons within and across focus groups to understand the unique work experiences that each participant had in relation to children's sleep and circadian environment. Each stage of coding and analysis was iteratively designed, discussed, and verified by the principal investigator and qualitative methodologist. Data collection ceased when focus groups stopped yielding new meaningful information.[21]

3 | RESULTS

A total of four focus groups were conducted, with 25 total participants (range = 2-9 participants/group). As seen in Table 1, participants were primarily female (88.0%) and had an average age of 28.5 years (SD = 6.1; range = 20-45). They reported an average of 4.3 years

TABLE 1 Self-reported participant characteristics ($N = 25$).

Patient characteristics	Mean (SD)	Range or *n* (%)
Age (years)	28.5 (6.1)	20-45
Gender		
Male		3 (12.0%)
Female		22 (88.0%)
Years of experience (working with stem cell transplant patients)	4.3 (4.5)	0.3-21
Hours worked (per week)	35.1 (5.8)	12-40

of experience working with SCT patients (SD = 4.5; range = 0.3-21.0). On average, participants worked 35.1 hours/week (SD = 5.8; range = 12-40).

We identified three key themes from the focus group discussions (Table 2). These reflect the awareness among nurses of how disruptive the hospital environment is for pediatric SCT patients, how much effort they put in to try and minimize the impact of these disruptions for the patient, and suggestions for how to improve the issue, along with perceived barriers that could impede implementation.

Theme 1: Participants are acutely aware of the many sleep/circadian disruptions experienced by pediatric SCT patients.

There was a consistent discussion both within and across all four focus groups that the sleep/circadian environment for patients was an issue. Across all groups, there was consensus that the IV pump alarms that go off in patient rooms were the most problematic source of noise disturbance. The pump alarms were problematic throughout the day and night, with participants noting that they were loud even on the lowest volume setting and required a clinician to manually turn them off. Participants described that a fair number of the alarms were false alarms, adding to everyone's overall frustration. Participants noted that even after their shift ended, they could still hear "the alarms going off in my head," and expressed empathy for patients/families for which the circumstances for an extended hospital stay were "obviously not great." Pump alarms were coupled with frequent vital sign assessments and the administration of medications around the clock, required by SCT patients but resulting in continuous disruptions. Other disruptions brought up by participants were the pickup of trash and medical waste (e.g., syringes) and medical consults (e.g., surgery), both predominantly occurring in the early morning hours between 4 and 7 AM. Participants also focused on the physical environment of the transplant unit.

Participants noted that the small size of the rooms resulted in them bumping into furniture and exposing families to artificial lights when using the computers in the rooms. They reported that the patients' rooms had poor soundproofing, explaining that even quiet conversations in adjacent rooms could be heard at night. As a result, even routine work that occurred in the vicinity of a patient's room (e.g., opening/closing a cabinet or getting paper towels) could be disruptive. Staff conversation, often necessary discussions centered around patient care, could also be disruptive. These potential disruptors are visually presented in Figure 1.

The participants' heightened awareness of the poor sleep environment was reinforced because families often brought up these issues to them during the child's inpatient hospitalization. Family complaints were focused primarily on the disruptions during the overnight sleep period, rather than daytime issues. Some families vocalized their concerns to nursing staff regarding particularly problematic evenings, whereas other families were perceived to be reluctant to request the nurse's attention to address a sleep/circadian issue due to concerns of being burdensome, often allowing the alarms to continue for extended periods of time. It was noted that despite how challenging of an environment the transplant unit was, it might still be better than other hospital units because patients undergoing an SCT are in single occupancy rooms due to their health status.

Theme 2: Participants put forth considerable individual effort to try and mitigate the impact of the environmental/medical issues that affect the sleep/circadian health of their patients.

In every focus group, participants reported they made significant individual efforts to try and mitigate the sleep/circadian disturbances that patients and their families had to endure. Because SCT patients require frequent vital sign assessment and administration of medications around the clock, one point that was repeatedly raised by participants was their efforts to "cluster care" in order to reduce the number of times they interrupted the patient and their family for medical procedures. This was a practice they were more likely to consciously engage in during the overnight period. One of the ways this could be achieved was to actively collaborate in patient care with other nurses in order to juggle the needs of the multiple patients that each nurse was responsible for. Beyond clustering care, other participants described efforts to try to reduce the amount of light and noise they created in the patients' rooms at night by preparing as much as they could "outside of the room" and using the quietest/dimmest settings on any electronic devices necessary for patient care. The participants were so conscientious in their efforts that one "bought an Apple Watch the week after [they] started here" so they could set a reminder to check patients' pumps before an alarm might go off. It was mentioned that the participants' efforts on how to maintain a healthy sleep/circadian environment for patients were not the result of formal training at the hospital. Rather, during the orientation period for new nursing staff, senior nurses would pass down their knowledge pertaining to the subject. Furthermore, one nurse noted there was a lack of consistent messaging in the unit about the importance of daytime light and nighttime darkness for circadian health, drawing parallels to how there are more "pervasive" messages directed toward other important matters, such as infection control. It was believed that if patients could be taught about the importance of sleep/circadian health issues, it could help nurses create a better sleep/circadian environment with more enthusiastic buy-in from patients/families.

Similarly, participants explained that families also often made significant efforts to reduce barriers to sleep. A common request families made was for devices that produced white noise (e.g., humidifier and smart speaker). One participant reported that more than one family requested foam tape to be placed on the door to prevent it from loudly

TABLE 2 Key themes and exemplar quotes.

Theme	Exemplar quotes
THEME 1: Participants are acutely aware of the many sleep/circadian disruptions experienced by pediatric stem cell transplant patients.	"I don't think it's good rest. I think it's like naps here and there. Because as soon as they fall asleep probably some someone's gonna come and do something, ask them something because it's day time."
	"I really just can only imagine for patients is like I went home last night, and it was just completely quiet. And I just heard the alarms going off in my head. And I was only here for like, 13 hours or whatever."
	"They used to come and change the syringe boxes every morning at 5AM in every single room. They are people who I don't think work patient care, so they go in the room, not close the door, like slowly, they'd have a loud key have to open the syringe box, take the syringe out, and it's just so loud and then put the other one back in and leave and not like quietly shut the door. So I feel like that's disruptive. I feel like a lot of times, like things that need to be done like the trash has to be taken out. But I feel like sometimes that's also done at like, 6AM."
	''*Nurse 1*: During the day, the hallway is insanely loud.
	Nurse 2: All the seats in the hallway are taken, with people talking.
	Nurse 3: All the different staff, like nutrition, physical therapy, occupational, there's every team on the floor, in and out. And they're not quiet.''
	"I would say though we're a smaller unit, and we try to like limit the amount of people that come through, like, we don't have a lot of people walking around. So I've generally heard that, like, it's quieter than most units and such like that."
	''Some parents are more vocal about like 'oh we didn't sleep well last night, that kept beeping'…that's like one of the first things I feel family's say in the morning.''
	"So parents don't even call out. Because they're just like afraid to bother us or whatever…Even if you told them 'hey it's okay to call out' some of them are just like, they don't want to bother you."
	''*Nurse 1*: Sometimes we'll have patients with chemo that won't beep out for two hours, and their chemo wasn't running and we didn't know it was beeping in the room…There's no way for us to know unless they come get us.
	Nurse 2: Alarm fatigue. There's so much going on. And like that's all going on in their rooms.''
	"We've had parents hang blankets over the pump and monitors…So I know it bothers families."
	''*Nurse 1*: Nightshift will always shut the monitor screen off.
	Nurse 2: A lot of us don't like the use of computers unless we have to overnight, like people are trying to use the phones for meds because it is so bright.
	Nurse 1: It's like a 1 through 10, so I feel like usually we just do one [for monitor brightness].
	Nurse 2: Yeah that's still bright. Nurse 3: I didn't know that these even dimmed until like a year into me being here.''
THEME 2: Participants put forth considerable individual effort to try and mitigate the impact of the environmental/medical issues that affect the sleep/circadian health of their patients.	"We all really do try to like, cluster our care, especially overnight and not be disruptive…hanging like multiple things at once. Like whatever it's like compatible, and like every line they have, or like getting their vital signs when you're already in the room for something else."
	"We collaborate with our clinical assistants…I feel like if I especially knew that a patient hadn't slept for like few days, and they were very vocal about that, and trying to like cluster cares and whatnot, and I had the time to do vital signs, each time I was in there doing something else around the time that they would do her vital signs, I'm going to do that. So that it's one less person that has to go into the room…But like, you don't always have the ability as the nurse to do that to like if I had a very busy patient assignment, I can't necessarily make the time to get all of my patient's vitals that night to build into the workflow for the clinical assistants."
	"I feel like night shift goes like above and beyond to try to limit the light from these computers…A lot of people use their phones to scan as much as they can on their phone. But also like, I'll come in for a day shift in there's like, the screen is off, there is a blanket over the computer like people like make their job harder in order to try to like limit the light for patients."
	"A lot of us do a good job of trying to set alarms to like, catch beeps, especially overnight…if you know a medication is going to beep in 10 minutes you like go in in 9 minutes and you kind of just stand there awkwardly. Like, as soon as it beeps you turn it off."
	''*Nurse 1*: I just oriented a new grad and that was something like one of our big things that we focused on was, what time is this going to be when you need to go back in the room and being aware of how long your meds run for.
	Nurse 2: The culture on the floor is like when you're on orientation, like your preceptors are doing it so you are taught to like catch beeps.
	Nurse 3: Get your beeps! You don't let them beep for 10 minutes in the room and then run in.''

(Continues)

TABLE 2 (Continued)

Theme	Exemplar quotes
THEME 3: Participants identified potential beneficial changes, but were frustrated by the many barriers they experienced that make it difficult, and sometimes impossible, to improve the situation.	"Even just thinking about the amount of medications all of our patients have, so the amount of times that you're going into the room just because of like medications, hanging medications, going in to flush medications, going in because it's been occluded because of the way that they're laying…I feel like they just require such a high level of care and so much attention and so many things that even when you're trying so hard to cluster your care, the cluster ends up being like 12 hours of worth of care in the room." ''*Nurse 1*: We do a lot of our blood products overnight. But we do that for a reason based on our patient population. So I don't really feel like that could change. *Nurse 2*: I feel like safety wise, they would never change that. *Nurse 3*: If somebody needs blood products, or they are getting a lot of vital signs, it's inevitable that you're gonna have to get vital signs at a certain time and then that might not be right when you're there…We can't say 'oh, well, we'll get our 15 minute vital signs at the 45 minute mark' because that's like, against, policy.'' "The number one thing I would do is set something up on the pumps so that it would not beep in the room. It would be directly to the nurse's phone or be on vibrate. There's no reason the patient needs to hear beeping, they're not the one fixing it. So I don't understand how that's like not a thing." "These phones like technically are supposed to be replacing, or are able to replace the computers that are in the room and have like all the technology. But half the time these scanners don't work…It doesn't feel safe, because it's really hard to do double checks on it. Like the software isn't reliable and the phones themselves aren't reliable." ''*Nurse 1*: I feel like there just needs to be better insulation in between each room. You can hear your neighbor having a conversation if it's a loud kid. So if you have a teenager next to a baby, the teenager's not going to bed until midnight and they're playing video games screaming to their friend on the phone and then the baby next door you're like yeah sorry. *Nurse 2*: I totally agree with the insulation. *Nurse 3*: The walls are paper thin.'' ''*Nurse 1*: Some doors that slam and are really loud. And we tried to like always, like, have them gently or like, you know, and I might teach other people do but not everyone, not everyone does. And sometimes, you know, people are in a rush and they might like run out of one room and go in another. *Nurse 2*: The doors and the walls are not nearly soundproof. At night, even though it's not so loud, you can actually, if you are in [room number] you can hear someone that is speaking outside.'' "Bigger rooms would be nice too. Because in the smaller rooms stuff can get like really close together. And then like you have the IV pole and that's hitting the monitor and that's turning on the monitor when the monitor doesn't need to be on, or the pole and the bed and then there's the table, and you're like running to come over…I always just accidentally run into stuff and then it's loud and you try not to but it's hard especially when it's dark in the room too. And then you're trying not to like trip over all the different things that are so compressed in a little area like that." ''*Nurse 1*: [Two specific rooms] are examples of a place, you know, they have the ante room. So having a little mudroom, and all the different rooms would be amazing if there was just like a little nursing workspace. Which aside from light would be also, I think it would help for noise even too, because you know, you're just at least a little bit away. *Nurse 2*: Yeah. Even when the door is open. *Nurse 3*: A nursing mudroom.''

clicking closed, though this was not possible to provide due to hospital safety policies.

Theme 3: Participants identified potential beneficial changes, but were frustrated by the many barriers they experienced in trying to improve the situation.

Despite the participants' best intentions, many described barriers to an appropriate sleep/circadian health environment that existed in multiple domains. The dimensions that were most frequently explored by participants were: (a) complicated medical context/necessary medical procedures; (b) hospital workflow; (c) technological limitations; and (d) physical environments.

a. Participants often described the medical complexities of children undergoing SCT. They require more medications, more frequent

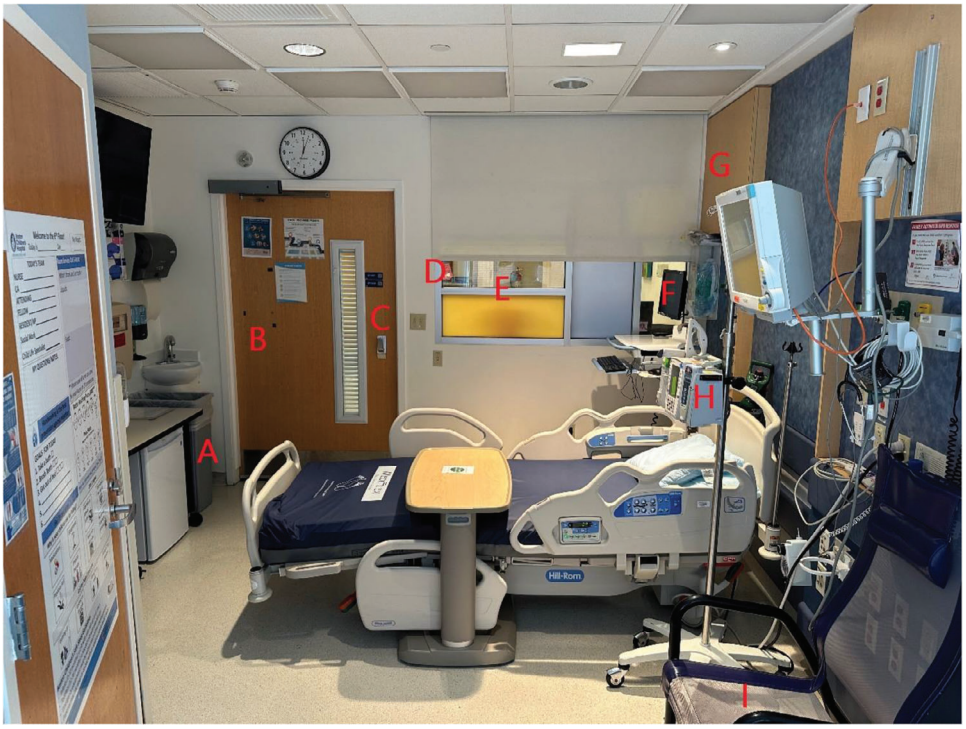

FIGURE 1 Visual representation of notable sources of sound and light disruption in the patient room at our hospital. A: Early morning trash/sharps pickup. B: Poorly insulated door. C: Loud door latch. D: Poorly insulated windows and walls. E: Staff hallway noise. F: Computer monitor light. G: Cabinets open/close loudly. H: Pump alarms. I: Staff bumping into furniture in small room .

medication dosing, and more constant check-ins (e.g., vitals) than most other hospital inpatients. All of these medically necessary procedures interfere with the patient's ability to get uninterrupted sleep throughout the night because of the 24-hour nonstop treatment that is required. Consistently, participants viewed these medical interruptions as immutable, despite their efforts to try to minimize the frequency of interruptions by clustering procedures together.

b. Even though participants strived to dampen the impact that all of the medical procedures had on sleep/circadian health, many indicated that their efforts were affected by the hospital workflow in the busy hospital inpatient environment. Nurses and their direct support staff (e.g., clinical assistants) are responsible for more than one patient during their shift, which hampers their efforts to reduce noise interruptions. In addition, there are other hospital clinicians and employees who are performing their specific job duties (e.g., emptying garbage and medical waste), without any knowledge of how their work impacts the children in the unit. This is especially a problem during the early morning hours, when there are providers from other departments present as well.

c. As nurses attempted to mitigate the impact of medical care and hospital workflow on the children's sleep/circadian health, they expressed the most frustration at the many technological limitations they encountered with IV pumps, smartphones, and computers. Patients required multiple IV lines with alarms at different times because of varying medication administration patterns. This prevented nurses from being able to preemptively turn them off or cluster their care to turn multiple alarms off at once. To address this, participants consistently expressed a desire to have pump alarms be sent away to a centralized location (e.g., nurse's workroom) or directly to their work cell phone. A second technology that participants reported struggling with was their work smartphones and the computers in patient rooms. The smartphones are intended to help reduce dependence on computers, but most participants described them as being unreliable and hard to customize to their needs (e.g., cannot set the phone to vibrate at night). For example, they found themselves having to repeat scans that they had completed on their phones on the computers in patient rooms, exacerbating disruptions to patients. Further, some participants noted that they were not aware of how to turn down a monitor screen's brightness.

d. Another challenge that participants face relates to the existing design of the patient rooms, which are not conducive to sleep/circadian health (Figure 1). As noted in Theme 1, there were issues related to poor soundproofing in patient rooms and suboptimal design of the space that resulted in unnecessary exposure to noise/light. To improve this, participants recommended changes that ranged from low-intensity interventions (e.g., a privacy screen to reduce monitor light, quieter computer keyboards, small flashlights, and wall lights that patients control to introduce daytime light), to some which would require a larger investment of time and resources (e.g., trash drawers built into the wall which can slide outside of a room, to allow for emptying without needing to enter the room; soft closing cabinets), to those which would require an overhauled unit (e.g., soundproof paneling and insulation in patient

rooms, additional windows, an anteroom separate from the patient room, and a nurse's workroom).

4 | DISCUSSION

In this qualitative study of nursing staff, we found that sleep and circadian disturbances are a known and significant issue for the front-line caregivers on a pediatric SCT unit. Within the constraints of the considerable medical needs of the patients and the physical room/hospital environment, nurses strive to minimize these disruptions to the best of their ability. Given the long length of stay for an average pediatric SCT patient, it is crucial that hospitals assess and remediate noise/light problem areas for these children.

Our data contribute to a mounting body of literature demonstrating that most pediatric SCT patients face an environment that is challenging for their sleep and circadian health.[22] Consequently, not only are the children at risk for poor sleep, but their parents/caregivers are just as likely to suffer, with a mere 12% in one study getting 6 or more hours of sleep a night.[23] Results from our focus groups explain that the heightened medical needs of the pediatric SCT patient population play a major role in their disruptive environment. These are potentially sick children with complicated medical situations whose health status can change rapidly. However, although some of the overnight medical procedures are necessary, researchers have questioned whether this is true of all procedures. Vital signs are important tools for detecting impending changes, allowing proactive intervention from physicians. Among adult SCT patients, data have suggested that less rigorous monitoring of vital signs for lower-risk patients may be safe and simultaneously allow for more uninterrupted time for those recovering after SCT.[24] Promising quality improvement work in a children's hospital showed that overnight vital signs could be safely decreased by 60% in a low-risk patient population without any adverse events.[25]

A second major challenge described by participants related to the limitations of the hospital room. Although nurses were quick to acknowledge that no patient expects their hospital room to resemble a "Hilton hotel," they pointed to poor soundproofing in all rooms, and insufficient or excess light exposure depending on the room. Interventions, such as the addition of strategically placed sound acoustic panels in the hallways around patient rooms, can make a difference.[26] There are guidelines for the design and construction of healthcare facilities that provide directives on sound transmission limitations. In existing buildings, the sound transmission limitations are at a low threshold: between patient rooms, a sound transmission class rating of 35 is permissible—at this level, loud speech in one room can be clearly heard in the next. Notably, beyond encouraging natural light in rooms, there are no recommendations for light exposure.[27] Although there have been studies conducted on the redesign of hospital rooms to improve safety[28] and efficiency,[29] little has been done to systematically address problematic sound or light levels. As hospital noise levels have steadily increased over the past 70 years,[30] it is urgently needed for administrators to prioritize this problem. Unfortunately, many of our study participants indicated that they are an overlooked partner group when it comes to making decisions that could impact patients' sleep and circadian environment; for example, their voices were not part of the discussion when it came to deciding whether a nursing backroom would be part of the design of a renovated unit.

Despite the clear role that medical procedures and the hospital environment play in impairing sleep and circadian health, a systematic review demonstrated that the vast majority of sleep-promoting interventions for hospitalized children target the patient directly.[31] However, a recent literature review on the topic of inpatient sleep concluded that the acuity of the patients' health condition(s) requiring hospitalization can cause them to deprioritize the importance of sleep.[32] Thus, it may be that targeting the hospital environment[33] and/or providers may be a more meaningful path forward. Interventionists have developed educational protocols targeting nurses to improve inpatient sleep.[34] Nurses in our study reported that sleep and circadian issues are at the forefront of their minds during patient care, consistent with other research in which nurses viewed helping patients sleep better as a vital part of their job.[35] Therefore, it is essential that hospitals develop organizational sleep and circadian policies/protocols for pediatric inpatients, including regular assessments of sleep and circadian health.[32,36]

We recognize the limitations of our work. First, our sample comprised nurses on one pediatric SCT unit of a large academic medical center. The experiences reported upon here may not be reflective of SCT units across the country, nor of the entire hospital staff. The perspectives of other groups (e.g., hospital leadership) would be valuable to obtain. Second, nurses in our sample care for a unique patient population who have very different medical needs than other children in the hospital. Therefore, our conclusions may not be transferable to other pediatric inpatient populations.

In conclusion, prioritizing a good sleep and a circadian environment is not only good medicine but fundamental to patient-centered care.[37] Within the constraints of the considerable medical needs of pediatric SCT patients and the physical room/hospital environment, nurses are already very diligent about trying to minimize disruptions. Moving forward, it is important that hospitals assess and remediate noise/light disturbances for these children, given the critical implications this has for their health. As we begin to think about how to change hospital policies around the sleep and circadian environment, nurses are key partners that administrators should speak with when beginning to consider how to solve these problems at their institution. They may play an integral role in leading the charge toward encouraging better sleep for patients and their families.

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CONFLICT OF INTEREST STATEMENT

The authors do not have any conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

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

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