

EMPIRICAL RESEARCH QUALITATIVE OPEN ACCESS

Understanding Nurses' Needs Regarding Tailored, Evidence-Based Sleep Education and Training

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ABSTRACT

Aim: Identify desired training content for shift-working nurses to improve their sleep and fatigue.

Design: A descriptive qualitative design.

Methods: We recruited night shift nurses ($N=23$) to provide feedback during virtual focus groups/interviews. Data collection occurred in the U.S. between March and June 2024. Participants were presented with sleep and fatigue topics derived from the literature. Focus group/interview data were collected and transcribed. Data were analysed using a hybrid deductive-inductive manifest content analysis with an a priori coding schema based on topics shared during data collection. Data not fitting the schema, yet informing content, were analysed inductively.

Results: Three themes aligned with literature-derived topics. Theme 1, *Why We Sleep and Why Should Nurses Care*, explains the importance of sleep to health. Theme 2, *Sleep Practices for Nurses to Support Health and Social Relationships*, describes healthy strategies to promote sleep for enhanced quality of life. Theme 3, *Fatigue and Work*, illustrates the significance of nurse sleep and fatigue risk mitigation to safe working conditions and patient care.

Conclusions: Study findings highlight night shift nurses' interest in gaining evidence-based information to promote their sleep. Sleep education and training could fill a knowledge and skills gap, not often offered in school or workplace.

Implications for the Profession: Identifying themes relevant to nurses may help increase the development and availability of sleep education and training currently tailored for nurses.

Impact:

- Study findings describe content night shift nurses' desire for sleep and fatigue training, serving as an important first step in developing programmes most relevant to shift-working nurses.
- Our analysis found the findings largely align with key components workers should receive in sleep education and training and reinforced the need for employers to offer such training.
- This study could benefit the nursing workforce and employers who expect rested, high-functioning nurses to care for patients.

Reporting Method: Standards for Reporting Qualitative Research.

Patient or Public Contribution: No patient or public contribution.

Trial and Protocol Registration: [Clinicaltrials.gov](https://clinicaltrials.gov), NCT06105307

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Summary

- What does this paper contribute to the wider global clinical community?
 - Identifying content areas relevant to nurses may help increase the development and availability of sleep education and training programmes currently tailored for nurses, particularly in countries where training is limited.

1 | Introduction

Over half of the 5.2 million registered nurses in the U.S. work in healthcare facilities where providers are needed around the clock (Smiley et al. 2023). Nurses often work long and/or irregular hours (e.g., night shifts, rotating shifts, early mornings), increasing their risk for shortened, poor-quality sleep and adverse health outcomes (Torquati et al. 2019; Li et al. 2020; International Agency for Research on Cancer 2020; Farag et al. 2021). Inadequate sleep among nurses can contribute to fatigue and decreased alertness, endangering worker and patient safety (Farag et al. 2024; Barker and Nussbaum 2011). While these negative outcomes can have serious consequences, solutions to improving sleep and managing associated risks are not simple. Employers cannot always control hazards stemming from personal factors (e.g., age, competing demands) (Farag et al. 2021; Groves et al. 2020). Work-related factors (e.g., scheduling, patient load, time pressure, inadequate staffing) (Farag et al. 2021; Groves et al. 2020) can fluctuate based on workforce availability and community demands for acute care (Dawson and Thomas 2019). As such, solutions to sleep- and fatigue-related issues in healthcare are rarely implemented (Steege, Pinekenstein, Rainbow, and Arsenault 2017).

Worker education and training is integral for occupational health and safety. In other around-the-clock, safety-critical work environments, such as aviation, sleep education and training is often a key part of a larger fatigue risk management system (FRMS) (Federal Aviation Administration 2012). This approach engages employees and employers in joint responsibility to collaboratively manage risk factors for inadequate sleep and fatigue. Employee-provided worker education and training for nurses, focused on obtaining adequate, restorative sleep, might address the complex contributors to fatigue stemming from nurses' home and work, and in turn, bolster worker and patient safety in healthcare.

Sleep education and training for nurses has not been widely implemented (American Nurses Association 2014; Caruso et al. 2022; Caruso et al. 2019; Querstret et al. 2020). Only approximately 8% of U.S. nurse leaders among a sample of $N=158$ reported that their organisations offer sleep and/or fatigue education for staff (Steege, Pinekenstein, Rainbow, and Arsenault 2017). Speculation on the limited uptake was attributed to a multitude of issues, including insufficient monitoring of fatigue-related errors, complexity in assessing fatigue, diffuse responsibility due to work vs. non-work causes of fatigue, and knowledge of the issue and desire for system change among healthcare leadership (Steege, Pinekenstein, Rainbow, and Arsenault 2017;

Steege, Pinekenstein, Rainbow, and Arsenault Knudsen 2017). In a post-pandemic environment, where nurse fatigue, burnout, and retention issues persist (Lasater 2024), the call for change is resounding (Weaver and Wurmser 2024). However, nurse leaders and organisations may be hesitant to introduce sleep education or training, as there are few evidence-based programmes available designed to meet nurses' needs (Hittle et al. 2023). Therefore, the purpose of this study was to identify components for a sleep education and training that nurses believe helpful in supporting their sleep and reducing fatigue. Identifying these components may lead to more effective programmes for use in the healthcare industry.

2 | Theoretical Framework

This study was guided by a Fatigue Risk Management Systems (FRMS) framework, based on Dawson and McCulloch's (Dawson and McCulloch 2005) error trajectory model. The model proposes a chain of events or conditions leading up to a fatigue-related injury or error and identifies levels of control mechanisms for preventing progression along the trajectory. The initial basis of an incident is fatigue resulting from insufficient sleep, an extended period of wakefulness, and/or inadequate break time to obtain restful sleep and recovery, leading to experiencing behavioural fatigue symptoms (i.e., cognitive deficits). Those fatigue symptoms can result in a fatigue-related error which, when not stopped by later controls, culminates in a fatigue-related incident. For example, a sleepy nurse may select the wrong medication (fatigue-related error) and, if the patient's wristband is not scanned (control mechanism), a medication error may result (fatigue-related incident).

For this study, we focused on a control early in this trajectory: using sleep and fatigue education to promote sleep during off-shift hours, reducing the likelihood of on-the-job sleepiness and eventual progression to fatigue-related incidents. Within the FRMS framework, controls providing a multi-layered, joint approach between employers and workers are outlined in detail by Wong, Popkin and Folkard (Wong et al. 2019) and the American College of Occupational and Environmental Medicine's (ACOEM) Presidential Task Force Guidance Statement on Fatigue Risk Management in the Workplace (Lerman et al. 2012). Specifically, the ACOEM guidance (Lerman et al. 2012) includes a comprehensive 11-point plan for content to incorporate in such employer-based education and training. We based our list of content topics to present to participants on this 11-point plan (Table 1), tailoring the list for nurses, grounded in evidence found in nursing literature (Hittle et al. 2023; Lee et al. 2021; National Institute for Occupational Safety and Health 2015).

3 | Methods

Virtual focus groups and interviews were conducted using a descriptive, qualitative approach, a method of inquiry aligning with our purpose for participants to explain their sleep education and training needs (Sandelowski 2000). Reporting follows the Standards for Reporting Qualitative Research (SRQR) guidelines (O'Brien et al. 2014).

TABLE 1 | Sleep education and training topics shared during focus groups and interviews.

List 1: Why we sleep and why should nurses care?
1. Basics of sleep physiology, circadian rhythms, and what it means to get adequate sleep
2. Sleep as one of the three pillars of health
3. The impact of not getting enough sleep on your personal relationships, mental/physical well-being, and general life satisfaction
4. How getting restful, quality sleep can help you manage fatigue
5. Sleep disorders—why they matter, how to tell if you may have one, and what to do about it
List 2: Healthy sleep practices for nurses
1. Sleep habits or behaviours that are specific for shift workers to support good sleep and reduce fatigue
2. Ways to promote social relationships in the context of shift work (strategies to keep social connections going even when your hours differ from others)
List 3: Activities to use when falling and staying asleep is difficult
1. Strategies to use when you have trouble falling or staying asleep, such as relaxation tools
2. Goal setting support to help you change specific habits related to sleep and fatigue
List 4: Fatigue and work
1. The risks to yourself, co-workers, and patients when you are fatigued at work
2. The benefits to yourself, co-workers, and patients when you are rested at work
3. How you and your employer can manage and minimise fatigue when it can and cannot be avoided
4. The value in recognising fatigue in yourself and your coworkers with information on signs and symptoms
5. Strategies to be used while at work to help with fatigue symptoms, such as appropriate use of caffeine, rest or exercise breaks, social interactions, and enlisting a buddy system
6. Dangers of drowsy driving and tips for safely commuting

Note: Topics were shared during virtual sessions using PowerPoint slides. Participants were asked what topics resonated with them, or did not resonate with them, and why.

3.1 | Sampling Strategy

We recruited participants from five acute care hospitals in the Midwest U.S. Hospital sites 1, 3, 4, and 5 are acute care adult hospitals. Site 2 is a paediatric hospital. Sites 1 through 4 are in urban areas, and site 5 is in a suburban location. Recruitment activities included meeting with nurses at shift change, unit meetings, and posting recruitment information within hospitals and employee newsletters. Recruitment and data collection took place between March and June 2024. Participants completed demographic information and screening questions using Research Electronic Data Capture (REDCap) (Harris et al. 2019). Inclusion criteria were: (a) being a registered nurse; (b) working night shift for the preceding 6 months; and (c) access to a smartphone. Exclusion criteria included: (a) being currently pregnant or having a child(ren) less than 1 year old; and (b) having ever been diagnosed with a sleeping disorder. Sampling ended when we reached data saturation (Lincoln and Guba 1985).

3.2 | Ethics

This study was approved by the University of Cincinnati Institutional Review Board's expedited review process.

3.3 | Data Collection Methods and Processing

After obtaining consent, we scheduled participants to attend a 90-min virtual focus group and asked them to complete an online socio-demographic survey. To be flexible with nurses' schedules, we sometimes arranged interviews. Using

interviews, as needed, instead of focus groups, is deemed acceptable in situations where the topic area is not sensitive and interviewees may speak openly (Cresswell 2013). Participants were given an e-card contingent on completing a focus group or interview, but not the survey. Data were collected using a semi-structured guide based on a list of sleep education and training topics (Table 1) derived from the ACOEM FRMS guidance (Lerman et al. 2012) and incorporating Cognitive Behavioural Therapy for Insomnia principles (McQuaid et al. n.d.; Baglioni et al. 2022; Edinger et al. 2021) tailoring it to meet nurses' needs (Hittle et al. 2023; National Institute for Occupational Safety and Health 2015). Final topics were reviewed and approved by experts in occupational health, fatigue, nursing, and sleep. During data collection, topics were shared via PowerPoint slides and participants were asked to describe why certain topics did or did not resonate with them. All focus groups and interviews were conducted, recorded, and transcribed via Zoom.

3.4 | Data Analysis

Survey data were analysed using descriptive statistics (frequencies, percentages, mean, standard deviation) with IBM SPSS, version 29. Verified transcripts were analysed using a hybrid qualitative deductive-inductive manifest content analysis (Bengtsson 2016; Bannon et al. 2024; Fereday and Muir-Cochrane 2006). Transcript data were coded first by identifying meaning units, then assigning the units to a priori coding schema based on the FRMS topics presented during data collection (Table 1). Identifying meaning units and coding was done independently by two team members (BH, AT), with a third member (GG) available for consensus. When data

relevant to the study purpose were found to not fit the schema, we used an inductive analysis method identifying emerging codes and themes. We then reviewed previously coded transcripts for these emerging themes while maintaining a surface analysis of participant words, consistent with manifest content analysis (Bengtsson 2016; Bannon et al. 2024; Fereday and Muir-Cochrane 2006). While some themes aligned with the topics shared during data collection (Table 1), revisions were made based on the data and in review with the study team, resulting in some topics merging into one theme.

3.5 | Trustworthiness

We took multiple steps to ensure trustworthiness (confirmability, credibility, dependability, transferability) in data collection and analysis (Lincoln and Guba 1985). Facilitators wrote reflexive statements acknowledging potential bias or preconceived beliefs on sleep, fatigue, and working as a hospital nurse. Zoom-generated transcripts were verified for verbatim accuracy and de-identified by watching the recording while reading the transcripts, editing discrepancies, and reviewing the transcript a second time. A second researcher, who also served as focus group facilitator, read each transcript for final verification. Two researchers (BH, AT) analysed transcripts independently; a third researcher (GG) assisted with consensus. Researchers maintained an audit trail of analysis progress and coding decisions. Findings were reviewed with the remaining study team.

3.5.1 | Confirmability

To support confirmability, reflexive statements acknowledged any researcher biases. We captured field notes during data collection for triangulation purposes and maintained a data collection activity logs. The team lead sought feedback on study findings from other team members.

3.5.2 | Credibility

To establish credibility, we used three techniques: prolonged engagement, triangulation, and peer debriefing. For prolonged engagement, the study was led by three nurse scientists with over 15 years of collective experience working in acute care hospitals. We triangulated our findings by collecting interview and focus group data until we reached saturation and compared findings to field notes taken by two facilitators during data collection. The lead nurse scientist conducted peer debriefing on data collection and study findings with two non-nurse scientists on the team with expertise in fatigue and shift work.

3.5.3 | Dependability

To verify dependability, we maintained an audit trail with the raw data for recordings (until final transcript verification), field notes, and surveys. We tracked our data collection activities and methodological decisions made during analysis. The codebook

was updated as refinements were made to the categories, codes, and themes. A final report was developed with a comparison of the a priori coding schema, as supported by data and a description of the research process.

3.5.4 | Transferability

To support transferability, we created a case report of the findings with data to support the themes.

4 | Results

Fifty-three nurses responded to the study invitation. After eligibility screening and consent, 23 participants completed a focus group or interview (see Figure 1). We conducted six focus groups and five interviews, resulting in 11 transcripts as units of study.

4.1 | Socio-Demographic Characteristics

Participants were compensated for joining a focus group/interview. Some opted to not complete the socio-demographic survey. However, we were able to ascertain some demographics from the study screening and qualitative data. Among the 23 participants, the average age was 32 years old (SD 10). Over one-third reported being a nurse for 1–5 years ($n=9$, 40.9%) and over half worked in adult acute care settings ($n=12$, 52.2%). Of the 14 participants who completed the socio-demographic survey, all but one self-identified as female at birth ($n=13$, 92.9%). Over half self-identified as White ($n=12$, 85.7%), had no children under 18 living at home ($n=12$, 85.7%), and reported a Baccalaureate degree as their highest educational degree ($n=10$, 71.4%). Participants reported working on average 37 h/week (SD 4) at one of the four urban hospitals where recruitment activity took place. We had no participants from hospital five (suburban) (Table 2).

4.2 | Qualitative Findings

Some topics presented during data collection did not resonate with participants as necessary to include in a training. When asked, participants reported these items were not important or could be subsumed under another topic. As a result, three themes were included in the final analysis (Table 3). A detailed explanation of where items from our list of topic areas were merged with another is provided in the theme descriptions, where appropriate.

4.3 | Theme 1: Why we Sleep and Why Should Nurses Care?

Theme 1 centers on the science of why sleep is important to life, physical and mental health, and relationships. This theme describes evidence surrounding how sleep loss impacts nurses during work and in their personal lives. Participants thought learning about the biology of sleep and circadian rhythms would help them commit to sleep-promoting behaviours. They also identified social relationships as a significant topic to include

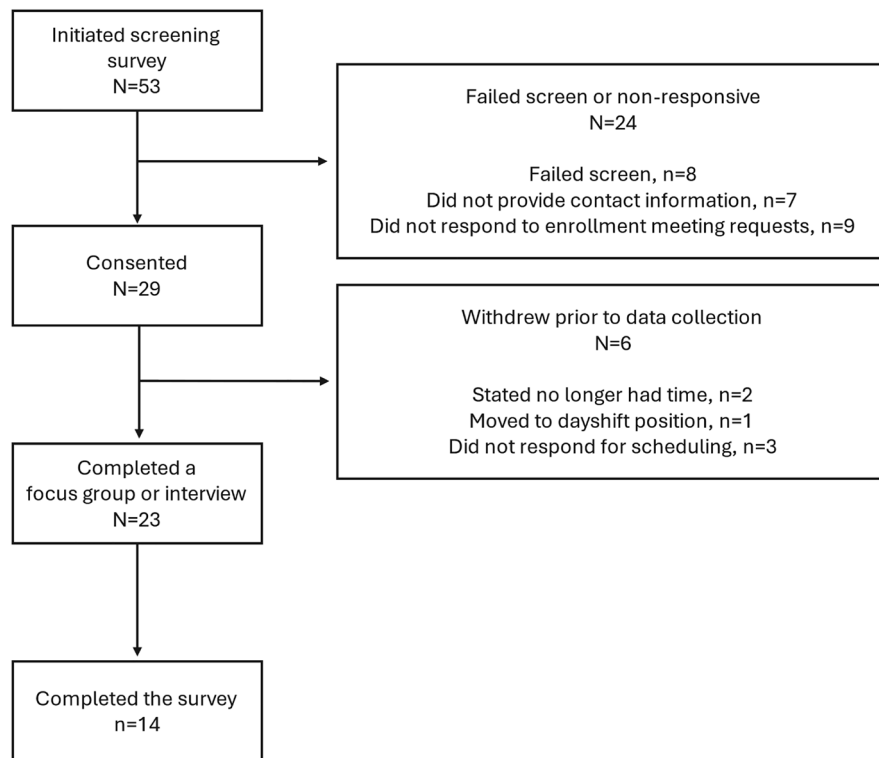


FIGURE 1 | Flowchart of screening and consenting participants.

as their lives are deeply impacted by irregular work and sleep patterns. Theme 1 has four subthemes, aligning with five topics presented during data collection. An additional topic, “How getting restful, quality sleep can help you manage fatigue”, was only identified as important by two participants. All others did not acknowledge it or as Participant 106 stated, “I feel like [sleep quality] just kind of goes along with the sleep disorders one, so it can almost be like lumped in.” As a result, this topic was removed from the a priori coding schema.

4.3.1 | Subtheme: Basics of Sleep Physiology, Circadian Rhythms, and What It Means to Get Adequate Sleep

Participants in eight transcripts reported understanding the basics of sleep physiology would be vital training content to include as it could provide an explanation for sleepiness and fatigue when working night shifts, making it easier to prioritise sleep. Participant 13 described:

I like the basics of sleep and physiology. I feel like always in nursing, at least for me, I always try and think of things that are happening in the body to help me try and learn from what my body likes to do.

4.3.2 | Subtheme: Sleep as One of the Three Pillars of Health

This subtheme, representing sleep, nutrition, and exercise, was noted in 10 transcripts as participants considered sleep a

component of health and bodily functions. They believed not sleeping well can affect everything in their lives, including mood, motivation, and physical health. From participant 26:

Not only does [not getting sleep] affect a lot of my relationships outside of work, I know that not getting enough sleep leads to heart disease ... I feel I've gained weight since I started doing [rotating shifts].

4.3.3 | Subtheme: The Impact of Not Getting Enough Sleep on Your Personal Relationships, Mental/Physical Well-Being, and General Life Satisfaction

Participants identified this topic in all 11 transcripts as impactful on their sleep and lives and necessary to include in training. They described how family and friends do not understand why they need to sleep during the day. Participants talked about difficulties staying connected socially while prioritising sleep. They mentioned sleep problems result in negative moods, making engaging with others difficult, causing isolation. Participant 7:

I think anyone who's ever worked night shift knows your personal relationships kind of take a hit because, 'Why can't you do this at 11 AM after you worked all night.' Okay? Well, because I need to go to bed. I'm tired, and I can do it at like 3 in the afternoon... if I'm working a string of days, I tend to stay on that night shift schedule for the day before

TABLE 2 | Socio-demographic characteristics of participants (*N* = 23, except where indicated with a footnote).

Characteristic	<i>n</i>	%	<i>M</i>	<i>SD</i>
Age			32 year	10 year
Sex ^a				
Female	13	92.9		
Male	1	7.1		
Race ^a				
American Indian or Alaska Native	0	0		
Asian	0	0		
Black or African American	2	14.3		
Native Hawaiian or Other Pacific Islander	0	0		
White	12	85.7		
Marital status ^b				
Married	5	38.5		
Divorced	0	0		
Widowed	0	0		
Separated	0	0		
Member of an unmarried couple	1	7.7		
Never married	7	53.8		
Number of children under 18 living in the house ^a				
One or more child(ren)	2	14.3		
No children	12	85.7		
Highest educational level ^a				
Baccalaureate degree in Nursing	10	71.4		
Completed graduate degree (Master's or Doctorate)	4	28.6		
Primary work area				
Adult acute care	12	52.2		
Paediatric acute care	11	47.8		
Years as an RN ^c				
Less than 1 year	4	18.8		

(Continues)

TABLE 2 | (Continued)

Characteristic	<i>n</i>	%	<i>M</i>	<i>SD</i>
1 to 5 years	9	40.9		
6 to 10 years	3	13.6		
11 or more years	6	27.2		
Weekly work hours ^a			37 h	4 h
Usual length of shift ^a				
8 h	0	0		
10 h	0	0		
12 h	13	100%		
16 h	0	0		

Note: Participants were compensated for completing a focus group or interview. Therefore, not everyone completed the sociodemographic survey, resulting in missing data. In places where there are responses from all participants, data were ascertained from screening and qualitative data.
^aNine participants did not respond.
^bTen participants did not respond.
^cOne participant did not respond.

and day after. So that can feel very isolating to be awake all night when everyone else is sleeping and things are closed... When you lose satisfaction in your relationships and you're feeling isolated, and you don't feel physically fit, that does take away from your whole life satisfaction.

4.3.4 | Subtheme: Sleep Disorders—Why They Matter, How to Tell if You May Have One, and What to Do About It

Participants in six transcripts shared a perception that most people are not informed about sleep disorders or what qualifies as one. They believed training in this area would help nurses know how sleep disorders are defined, allowing them to assess themselves for symptoms. Participant 11 explained, “I don't really know if anybody really knows what actually entails a sleep disorder. What makes my sleepiness a sleep disorder versus... I'm just tired?”

4.4 | Theme 2: Sleep Practices for Nurses to Support Health and Social Relationships

Theme 2 describes healthy practices participants use to support sleep, which, if included in a training, may help other nurses. Because participants rarely distinguished between everyday sleep routines (Table 1, List 2) and activities reserved for when it is hard to fall or stay asleep (Table 1, List 3), the lists were merged into one theme. They believed goal setting (e.g., restricting phone use before bedtime) and other support mechanisms may motivate them to improve sleep habits. Participants described challenges maintaining work-life balance when on night shift and shared strategies (e.g., texting) they use to preserve relationships while getting the sleep they need. Sometimes participants described unhealthy practices, including staying up after work to complete caretaking duties

TABLE 3 | Topics used for coding schema versus themes and subthemes stemming from study findings.

List 1: Why we sleep and why should nurses care? 1. Basics of sleep physiology, circadian rhythms, and what it means to get adequate sleep 2. Sleep as one of the three pillars of health 3. The impact of not getting enough sleep on your personal relationships, mental/physical well-being, and general life satisfaction 4. How getting restful, quality sleep can help you manage fatigue 5. Sleep disorders—Why they matter, how to tell if you may have one, and what to do about it	Theme 1. Why we sleep and why should nurses care? Subthemes: 1. Basics of sleep physiology, circadian rhythms and what it means to get adequate sleep 2. Sleep as one of the three pillars of health 3. The impact of not getting enough sleep on your personal relationships, mental/physical well-being, and general life satisfaction 4. Sleep disorders—Why they matter, how to tell if you may have one, and what to do about it
List 2: Healthy sleep practices for nurses^a 1. Sleep habits or behaviours that are specific for shift workers to support good sleep and reduce fatigue 2. Ways to promote social relationships in the context of shift work (strategies to keep social connections going even when your hours differ from others) List 3: Activities to use when falling and staying asleep is difficult^a 1. Strategies to use when you have trouble falling or staying asleep, such as relaxation tools 2. Goal setting support to help you change specific habits related to sleep and fatigue	Theme 2. Sleep practices for nurses to support health and social relationships Subthemes: 1. Sleep habits or behaviours specific for shift workers to support good sleep and reduce fatigue 2. Strategies to use when you have trouble falling or staying asleep 3. Goal setting support to help you change specific habits related to sleep and fatigue 4. Ways to promote social relationships in the context of shift work 5. Unhealthy practices related to sleep
List 4: Fatigue and work 1. The risks to yourself, co-workers, and patients when you are fatigued at work 2. The benefits to yourself, co-workers, and patients when you are rested at work 3. How you and your employer can manage and minimise fatigue when it can and cannot be avoided 4. The value in recognising fatigue in yourself and your coworkers with information on signs and symptoms^b 5. Strategies to be used while at work to help with fatigue symptoms, such as appropriate use of caffeine, rest or exercise breaks, social interactions, and enlisting a buddy system^b 6. Dangers of drowsy driving and tips for safely commuting^c	Theme 3. Fatigue and work Subthemes: 1. The risks to yourself co-workers, and patients when you are fatigued at work 2. The benefits to yourself co-workers, and patients when you are rested at work 3. How you and your employer can manage and minimise fatigue when it can and cannot be avoided 4. Recognising fatigue in yourself and your coworkers and strategies to use while at work to help with fatigue symptoms

Note: Topics used for the coding schema are based on the content shared with participants during data collection. Participants were asked, when thinking about what would be helpful to them in a sleep education and training programme, what topics most resonated.

^aAs participants did not see Lists 2 and 3 as distinct activities but as a set of activities used to support sleep, these lists were merged into one theme.

^bParticipants reported these items as closely connected, so items were merged into one subtheme.

^cParticipant descriptions of drowsing driving focused on their individual responses, which were largely not supported by evidence as effective. Therefore, this item was included with other unhealthy sleep practices into one subtheme under Theme 2.

at home, driving home when sleepy, and using sleep aids, underscoring the need for training in specific areas. There are five subthemes to support Theme 2.

4.4.1 | Subtheme: Sleep Habits or Behaviours Specific for Shift Workers to Support Good Sleep and Reduce Fatigue

Participants in all 11 transcripts shared behaviours regularly used for sleep, agreeing this is an important topic for a sleep education and training program. Behaviours included setting cell phones to “Do Not Disturb”, using sound machines or fans to block ambient noise, and installing blackout curtains. Participants in three transcripts described strict sleep schedules or routines used for workdays versus off days, acknowledging routines should be individualised. For example, eating or exercising before bedtime help some people sleep, while others found it disruptive. Behaviours less commonly mentioned were regular exercise and exposure to sunlight before a shift to elevate their mood and feel like they are living in “regular” society. Participant 7:

I can't eat and go straight to sleep. It gives me too much energy. I have to shower. I have my bedtime routine for working night shifts and I think that helps... I wake up 6, 7h later, and I feel refreshed... If I'm working a string of days, I tend to stay on that night shift schedule for the day before and day after.

4.4.2 | Subtheme: Ways to Promote Social Relationships in the Context of Shift Work

Participants in 10 transcripts described ways they protect their sleep and stay connected with family and friends. They believed including information on this topic in a training programme would benefit all nurses. Examples included intentional planning, where nurses either schedule work around important events and/or alert family/friends they are unavailable, scheduling time to reconnect after work. Participant 9:

I give people warnings that, ‘Hey? I’m getting ready to do my 6-day stretch so I might be harder to reach’... and a lot of people know that they can reach me right around dinner time, or right first thing in the morning on those days. And then, they know that the rest of the day I’m trying to sleep. I text a lot.

Some participants believed they could benefit from learning more on how to stay connected socially while communicating their need for uninterrupted sleep time.

4.4.3 | Subtheme: Strategies to Use When You Have Trouble Falling or Staying Asleep

Participants in six transcripts agreed learning about strategies to aid falling or staying asleep would be helpful. They described activities used to wind down after a stressful shift: exercising,

reading, engaging in relaxation methods, practicing meditation, breathing exercises, listening to meditative or relaxing music, and taking melatonin. Participant 13 shared their employer pays for meditation app access. “[The app has] some good meditation like sleep meditations that I’ll do. There are different sleep stories as well. Those, I feel, are pretty good when I can’t fall asleep.”

4.4.4 | Subtheme: Goal Setting Support to Help You Change Specific Habits Related to Sleep and Fatigue

Participants in nine transcripts offered how goal setting and support mechanisms may help improve sleep habits. Goals of interest included avoiding social media use before sleep, maintaining a regular exercise routine, and initiating their bedtime routine earlier. Some participants already relied on reminders or timers to maintain sleep schedules. Other wanted help creating detailed schedules to balance sleep with household responsibilities or a checklist of trusted sleep promoting behaviours or routines. A few participants felt motivation could be difficult, requiring multiple support methods. Participant 5 explained, “The reminders would be great, but I think I would need something else cause, even when my Apple watch tells me the time to stand up, I don’t stand up.”

4.4.5 | Subtheme: Unhealthy Practices Related to Sleep

Participants in eight transcripts described unhealthy decisions they made related to sleep, including shortening sleep time, not sleeping at all, or taking medications (e.g., antihistamines), reinforcing the need for more training and support in these areas. They made decisions based on life circumstances (e.g., child-care, going to school) or to stay connected in social relationships. Participant 15:

I caregive for my grandparents. Sometimes working night shift is a challenge, because they may have doctors’ appointments, or I may need to go sit with them. So somewhere in between all of that, either I sacrifice sleep, and I don’t sleep, or I don’t get very much sleep. I feel like I’m trying to catch up on sleep, like I’m constantly chasing it.

Participants in every transcript described driving home when sleepy, almost falling asleep during their commute. “During my role transition, I did get into an accident after doing four 10-h shifts in a row” (Participant 13). They shared stories of falling asleep at red lights or going through traffic lights and not remembering if it was green. They are afraid of being in a motor vehicle collision and shared strategies used to stay awake while driving, such as playing music, opening car windows for fresh air, and talking on phone during the commute. Unfortunately, these strategies are largely ineffective and may fail to keep individuals alert if sleep pressure is too high (Watson et al. 2015).

4.5 | Theme 3: Fatigue and Work

Theme 3 illustrates why adequate restful sleep and efforts to reduce fatigue are important to safe working conditions and

patient care. Participants explained strategies to mitigate fatigue and associated risks, what they think employers can do, if anything, and how this information can be beneficial to a training programme. There are four sub-themes.

4.5.1 | Subtheme: The Risks to Yourself, Co-Workers, and Patients When You Are Fatigued at Work

Participants in all 11 transcripts described mental slowness and difficulty focusing when sleep deprived, placing patients in jeopardy. They believe this is crucial to highlight in training. “[Organizations] have a lot of things in place now to try to decrease medication errors. Even if it’s not a medication, you might leave someone in the bathroom who needs to be accompanied, and they might fall” (Participant 30). Participants in four transcripts described having a more negative mood when they are tired, and as a result, they decrease engagement with patients and/or co-workers. “The risk to the patient is obviously serious... But I also think that when I’m really tired, I’m just not a good coworker. I’m kind of grouchy” (Participant 19).

4.5.2 | Subtheme: The Benefits to Yourself, Co-Workers, and Patients When You Are Rested at Work

For this subtheme, participants in six transcripts communicated the benefits to feeling well-rested: better mood, more motivated to help coworkers, and increased alertness to patient safety. One participant thought nurses may be more responsive if training highlighted work-related benefits to feeling well-rested, rather than focusing exclusively on the negatives of being sleepy. Participant 30 described:

[Feeling rested] is imperative, because when you feel your best at work, other people can feel that. If you have a little pep in your step, you don’t have a bad attitude, you handle situations better, you communicate better with your patients. You’re not so irritable... If you’re rested when you’re at work, I just feel like it changes everything, especially the patient care which is really the most important thing. That’s why we’re there, for the patients.

4.5.3 | Subtheme: How You and Your Employer Can Manage and Minimise Fatigue When It Can and Cannot be Avoided

Participants in eight transcripts hesitated to respond on what they believe employers can do to reduce fatigue. Eventually, participants in all 11 transcripts provided a variety of ideas encompassing support for nurses at work and home. While on duty, participants thought employers should ensure they get an uninterrupted lunch break where they can possibly nap and use decompression resources (e.g., massage chair, quiet room, Calm app). Participant 14:

Taking a 10–15 min nap at work can reset you, can help you get through the shift, or whatever and I

think if we utilize these rooms for that kind of stuff, it would be more helpful to our staff.

There were several suggestions for how managers could support nurses when at home. First, participants wished managers thought about the timing of calls or texts sent during the day when they are sleeping. Second, some participants reported calling off sick for shifts, when they have not been able to sleep. They feigned illness, instead of reporting an inability to work safely due to sleepiness and fatigue. Participants thought if nurse managers allowed more open communication surrounding poor sleep, there could be better solutions, such as calling off for a partial shift to obtain extra rest. Additionally, they believed managers honouring scheduling preferences or requests makes it easier to come to work well-rested, because they can better manage home and sleep schedules. Participants also advocated for education on how to balance their lives when working night shift and mitigate risks when working while tired. Participant 15:

A good start is educating your workers about what the risks are and how to stay out of the danger zone ... creating an environment where it’s okay to recognize your limit, and that doesn’t make you a bad nurse, or that doesn’t make you weak or anything.

4.5.4 | Subtheme: Recognising Fatigue in Yourself and Your Coworkers and Strategies to Use While at Work to Help With Fatigue Symptoms

This subtheme merges two items from the Fatigue and Work topic (Table 1), as participant responses to the two topics were intermingled. In eight transcripts, participants acknowledged learning to self-identify fatigue signs and symptoms could help them recognise their limitations and need for a break. Recognising fatigue in coworkers could assist nurses in supporting colleagues and protecting patients. Participants agreed the example strategies presented (e.g., caffeine, breaks, social interactions, buddy systems) are helpful and are approaches they currently use when feeling tired. In every transcript, participants talked about the uncertainty around how much caffeine intake is safe for personal health and how education in this area is needed. Some mentioned a broader solution or response should be in place, including education on communicating fatigue with coworkers and taking action. Participant 7: “Being able to recognize [fatigue] also has to have a solution. It’s like, ‘Okay, well, here’s the problem. You’re tired. You’re fatigued.’ But you know, what do we do with that information?”

5 | Discussion

This study assessed night shift nurses’ acceptability of sleep education and training components (Hittle et al. 2023; Lerman et al. 2012; National Institute for Occupational Safety and Health 2015; McQuaid et al. n.d.; Baglioni et al. 2022; Edinger

et al. 2021). Participants agreed the evidence-based topics presented were important to them, noting a few exceptions. They believed sleep physiology content should include the importance of quality, restful sleep instead of presenting it separately. They saw little distinction between daily sleep hygiene behaviours and strategies to use when experiencing insomnia symptoms. Still, the themes and subthemes presented underscore the significance of such training.

Findings reinforced the need and interest of nurse sleep education and training, content lacking in schools and workplaces (Meaklim et al. 2020). Participants believed health professionals are inherently eager to learn about sleep physiology and such knowledge will empower them to prioritise sleep. This finding is similar to studies among nursing students who reported receiving little sleep education in school, despite valuing and needing this information (Sawyer et al. 2022; Gellerstedt et al. 2019). By offering evidence-based nurse sleep education and training, employers can ensure their workers have tools for adequate and restful sleep. Training may allow workers to recognise when sleep difficulties are indicative of sleep disorders, another aspect of training participants desired. Increasing sleep disorder awareness could impact nurse health and patient safety, as estimates suggest approximately 25% of shift workers suffer from shift work disorder, a clinically diagnosed disorder characterised by both insomnia symptoms and sleepiness, resulting in extreme dysfunction at work and home (Wickwire et al. 2017; Pallesen et al. 2021).

Participants stressed wanting to learn how to obtain adequate sleep while working night shifts, maintaining relationships, and balancing competing demands. These findings reinforce what has been well documented among nurses (Groves et al. 2020) and shift workers more broadly (Arlinghaus et al. 2019). Some workplace strategies can help decrease work-life conflicts, such as giving workers control over their schedules and providing training (Arlinghaus et al. 2019). Sleep education and training can be designed to help nurses develop routines for workdays and off days, learn strategies to communicate need for restorative sleep, and help to foster relationships. Thus, training could offer a toolbox of solutions, so nurses can benefit from multiple strategies.

Similar to previous research, (Steege and Rainbow 2017; Hittle, Keller, et al. 2024) participants in our study initially identified sleep and fatigue risk mitigation as nurses' responsibility, as opposed to a joint approach between employers and employees (Wong et al. 2019). After consideration, they soon identified ways employers can support sleep and reduce fatigue risks, such as ensuring nurses have breaks during shifts. Participants acknowledged a need for skills to communicate more easily about fatigue with coworkers and employers. Workers in other industries where public care and safety is prioritised before their own, such as firefighting, similarly find communicating about fatigue challenging and vulnerable (Dawson et al. 2015). Vulnerability can indicate professional and organisational cultural barriers around sleep (Hittle, Gillespie, et al. 2021; Arora et al. 2007). Instituting FRMS with sleep education and training can be successful with a strong safety culture; however, more research is needed on how best to overcome cultural safety barriers (Sprajcer et al. 2022).

6 | Strengths and Limitations

Our study was strengthened by a purposeful sampling of night shift working nurses, as qualitative data benefits from homogenous groups (Cresswell 2013). Specifically, we restricted recruitment to night shift nurses, as night shift is directly in opposition to natural circadian rhythms, and thus challenging for obtaining restorative sleep. However, evidence supports nurses from all shifts experience fatigue and barriers to quality, restful sleep as a result of work and/or home circumstances (Farag et al. 2021; Groves et al. 2020). Therefore, as recommended by experts in the field (Caruso et al. 2019), sleep education and training for night shift nurses may be of value to any nurse managing sleep loss or fatigue, and applicability to those working other shifts should be explored. Because of the small, homogenous sample, the findings may not reflect the broader population of U.S. nurses. However, the purpose of qualitative research is to explore a deeper understanding of perceptions on a specific phenomenon with a homogenous group (Lincoln and Guba 1985). This demonstrates a strength of the study findings, reflecting individual experiences from our group of night shift nurses, with multiple participants confirming the responses. Still, future research is needed to evaluate these sleep education and training components among nurses from other regions (e.g., rural, international), as well as a larger group of nurses representative of the broader nursing community.

7 | Future Directions

Findings from this study highlight the need and desire for sleep education and training for night shift nurses, along with identifying content areas nurses deemed to be most relevant (noted in Table 3). Specifically, nurses discussed their experiences working irregular hours impacting their sleep and the downstream physiological and social implications, as well as their desire for evidence-based strategies for improving sleep under challenging environments and approaches to managing occupational fatigue symptoms. Identifying nurse-specific content allows healthcare employers to offer training that addresses unique barriers and promotes sleep health within shift-working nurses. Future research should test the impact of such a programme on nurses' sleep health, organisational outcomes (e.g., burnout, job satisfaction, patient safety), the effectiveness of various delivery methods (e.g., in-person, online synchronous, online self-paced), and training integration within different healthcare systems. In addition, acceptability of the content areas should be assessed, noting where adjustments would be needed. Finally, relevance of the content areas among other shift-working healthcare workers, such as support staff (e.g., nursing assistants), allied health personnel, and medical professionals, should be evaluated prior to introducing the training to a wider audience.

8 | Conclusion

Information on sleep loss when working shifts is rarely shared with nurses at school or work, despite the hazards poor sleep and fatigue can pose to personal and public health and patient safety. Sleep education and training could fill this gap with evidence-based strategies nurses have been seeking, while

trying to improve their sleep and reduce fatigue. By implementing such programmes, employers can work with nurses to address these concerns and limit fatigue and the associated risks to workers and patients. The present study helps guide what topics and strategies night shift nurses might value most. More research is needed to explore acceptability of content to nurses working other shifts. In addition, exploration on how best to overcome professional and organisational cultural barriers is needed. Understanding how to surmount these issues may lead to greater success in training implementation.

Author Contributions

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*): (1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content. *<http://www.icmje.org/recommendations/>. **Beverly M. Hittle**: conceptualisation, methodology, formal analysis, investigation, data curation, writing – original draft, writing – review and editing. **Imelda S. Wong**: conceptualisation, methodology, writing – review and editing. **Carolyn Smith**: conceptualisation, methodology, writing – review and editing. **Kimberly A. Honn**: conceptualisation, methodology, writing – review and editing. **Sarah Hamill-Skoch**: conceptualisation, methodology, writing – review and editing. **Joshua Lambert**: conceptualisation, methodology, writing – review and editing. **Angela Theil**: formal analysis, investigation, data curation, writing – review and editing. **Gordon L. Gillespie**: conceptualisation, methodology, formal analysis, investigation, data curation, writing – review and editing.

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The authors have nothing to report.

Ethics Statement

This study was approved for human subjects research by the University of Cincinnati, Institutional Review Board.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

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

Peer Review

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jan.70088>.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.