

Improve Sleep Quality in the ICU through a Sleep Promotion Program

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### **Problem Identification**

Sleep disturbance is commonly encountered for patients in the ICU and has significant psychophysiological effects that can lead to confusion and potentially delirium. The causes of sleep disturbance in the unit are multifactorial. Common nighttime activities that interrupt sleep include 1) Environmental factors such as light, noise level (alarms and talking); 2) Routine patient care such as labs, medication administration, bathing, and scans; 3) Time-sensitive care such as turns, toileting, assessments, and procedures; and 4) Severity of illness, pain, stress, and anxiety. Furthermore, adequate sleep has been confirmed to improve a patient's odds of being free of delirium in the ICU by 54 percent (Johns Hopkins Medicine, 2013). Implementation of a sleep promotion program is crucial to facilitate healing and prevent delirium.

### **Background**

In a Northern California 20-bed Intensive Care Unit (ICU) the average length of stay is three nights and unfortunately sleep interruptions begin immediately; and given that the patient clientele's health is already severely compromised, this adds insult to injury. Literature about sleep deprivation in the ICU and adverse effects are abundant. According to Pisani et al., "There is growing evidence that sleep disturbances are associated with adverse outcomes, and the impact of sleep deprivation in critically ill patients is gaining attention, as is the link between sleep loss and delirium" (2015).

Although hospital care is 24/7, running day after day and shift after shift humans need sleep to heal and maintain their quality of health. Implementing a sleep promotion program that includes the following 1) minimize noise and light on the unit from 2200 – 0600; 2) consolidate all routine and most time sensitive care to before 2200 and after 0600; and 3) provide

segments of four to six hours of continuous, uninterrupted sleep. These sleep promotion interventions will ensure adequate periods of restorative sleep and help prevent delirium.

### **Literature Review**

Research shows that sleep deprivation leading to delirium is a prevalent problem. "... Millions of intensive-care-unit (ICU) survivors, both young and old around the world, suffer from long lasting brain problems after they are cared for during critical illness (Critical Illness, Brain Dysfunction, and Survivorship (CIBS) Center, n.d.). Before this problem can be addressed, we need to understand when healing occurs during sleep. "Sleep has two predominate phases: non-rapid eye movement (NREM) and rapid eye movement (REM)" (Delaney et al., 2015).

Fragmented sleep, which often happens to patients in the ICU, interrupts those important sleep stages. During stage N3 of NREM sleep our body repairs and restores itself. "The N3 stage consists mostly of slow wave activity and is considered to be an anabolic and physically restorative stage. This stage is prominent in the first third of the night's sleep and is deemed to be the deepest and most restful stage of the sleep cycle. During slow wave sleep (SWS), metabolic activity is at its lowest leading to a reduction in oxygen consumption. Growth hormone is secreted during this stage which promotes protein synthesis, tissue healing, and physical recovery" (Delaney et al., 2015).

"Despite decades of research identifying the impact of the clinical environment on ICU patients' sleep, little has been accomplished in overcoming those factors that are purported to contribute to sleep disturbance" (Delaney et al., 2015). There are a multitude of factors, some of which can be manipulated (environment) and others that cannot (patient condition) which makes sleep deprivation a complex issue that is difficult to manage.

Environmental factors such as light or the lack of light affects melatonin secretion and can disrupt the normal circadian rhythm. “Nocturnal light levels as low as 100 to 500 lux can affect melatonin secretion, and nocturnal levels between 300 to 500 lux may disrupt the circadian cycle” (Elliott, McKinley, Cistulli, & Fien, 2013). Another is noise level (alarms and talking), as well as routine patient care activities (labs, turning, bathing, and scans), are other factors that disrupt patient sleep. “ICU patients can experience up to 60 interruptions nightly related to patient care activities” (Elliott, McKinley, Cistulli, & Fien, 2013). Patient conditions such as the underlying or severity of illness, stress, and pain also play a major role in sleep deprivation. Sleep deprivation can lead to Delirium when can cause adverse outcomes to patients in the ICU. “Delirium has been identified as an independent predictor for adverse patient outcomes including increased hospital length of stay, a persistent decline in cognitive status and increased patient mortality” (Delaney, Van Haren, & Lopez, 2015).

### **Identified Community and Stakeholders**

Based on the 2017 population estimates of the United States (U.S.) Census Bureau, the local community has a population of 501,901 (n.d.) and is comprised of a variety of ethnicities, educational, and socioeconomic levels. According to the U.S. Census Bureau the major ethnicities within the population are 49.7% White, 28.1% Hispanic, 18.4% Asian, and 13.7% African American; The percentage of the community who have achieved a bachelor’s degree or higher is 30.7% and the high school graduation rate is 87.3%; The median household income in the community is \$52,071, and the poverty rate is 21.4% and 12.6% of the population is without health insurance (n.d.). Although delirium is often associated with the elderly, it knows no race, color, or religious creed. Some of the risk factors associated with ICU delirium are age, length

of hospital stays, severity of illness, infection, alcohol use and pharmaceutical (benzodiazepine) administration.

Stakeholders at the bedside such as physicians, nurses, and respiratory therapists have a vested interest in collaborating to implement a sleep promotion program to prevent poor clinical outcomes and increased length of stay. Stakeholders in the community such as the elderly and persons with underlying medical issues, who are at high risk for delirium, have a vested interest in a sleep promotion program – but is not apparent until they are hospitalized. This population can suffer increased medical costs and increase length of stay that can lead to delirium.

In order for the sleep promotion program to be effective and reach its potential, ancillary support for the sleep promotion program should come from the assistant nurse managers, managers, as well as the hospital Chief Nurse Officer (CNO).

### **Data Metrics and Benchmarks**

According to Kamdar et al. (2016) Measuring vital signs, noise levels, ventilator management and/or suctioning, and medication administration were ranked by respondents as the top four factors disturbing patient sleep in the ICU setting (Table 1).

Table 1.

Perceived causes and consequences of sleep in the ICU

Factors Disturbing Sleep in the ICU	All Respondents	
	Average Rank	Rank
Measuring vital signs	3.82	1
Noise levels	3.97	2
Ventilator management	4.24	3
Medication administration	4.27	4
Light levels	5.96	5
Patient repositioning	6.08	6
Physical exam	6.35	7
Radiographic studies	6.63	8
Bathing	7.88	9

Wound care	8.10	10
Visitation from family/friends	8.87	11

Kamdar, B. B., Knauert, M. P., Jones, S. F., Parsons, E. C., Parthasarathy, S., Pisani, M. A.,  
(2016)

*Definition of abbreviation:* ICU = intensive care unit.

Rankings range from most important (1) to least important (11).

Average ranking for each factor by 1,197 (of 1,223 total) participants who completed the ranking list. Of 1,206 participants who responded yes, no, or unknown, 1,187 completed the ranking list question.

In the acute care setting the following evaluation tools can be used to determine the effectiveness of a sleep promotion program; Patient/family interviews, Health Connect “slept shift” field to be filled in every shift, and Confusion Assessment Method (CAM)-ICU scores (Table 2).

Delirium affects up to 89% of ICU patients and has been shown to result in higher mortality.

The relative risk of death increases for each day the patient remains delirious (Inouye, 2005-2018). Prompt recognition of this condition is therefore important.

### **The Confusion Assessment Method for the ICU**

Is mental status different than baseline or has the patient had any fluctuation in mental status in the past 24 hr?
Say to the patient, “I am going to read you a series of 10 letters. Whenever you hear the letter ‘A,’ indicate by squeezing my hand.” Read letters from the following letter list in a normal tone 3 seconds apart. “SAVEAHAART” (Errors are counted when patient fails to squeeze on the letter “A” and when the patient squeezes on any letter other than “A”) Absent Present absent (8-10 correct) inattention (4-7 correct) severe inattention (0-3 correct)
<b>3. Altered level of consciousness</b> Absent (RASS = 0) altered level (RASS = 1 or -1) severe altered level (RASS > 1 or < -1)
<b>4. Disorganized thinking</b> Absent (4 or more correct) disorganized thinking (2 or 3 correct) severe disorganized thinking (0 or 1 correct)

Inouye, S. K. M.D. (2005-2018).

To this day delirium remains a clinical diagnosis and few clinical tools have been demonstrated to be useful in helping identify the presence or absence of delirium.

### **Caritas 5 & 7**

Teamwork and effective communication between committee members, physicians, and ICU night shift staff will be necessary to raise awareness of sleep deprivation and its effect on patient outcomes. Moreover, to encourage staff acceptance of a sleep promotion program, committee members will need to incorporate Caritas five of Jean Watson's caring science theory (Watson, 2008), "Being present to, and supportive of the expression of positive and negative feelings" (p. 34). By promoting and acknowledging the expression of both positive and negative feelings during the process of change, it will encourage personal connection, allow for reflection of feelings and experiences, and give support to change and growth. Practicing Caritas seven "Engaging in genuine teaching-learning experience that attends to wholeness and meaning, attempting to stay within other's frame of reference" (Watson, 2008, p. 34) will also be necessary during this process of change. Being respectful in the delivery of information, encouraging questions and input, and being genuinely present will facilitate collaboration and a safe learning environment.

### **Teamwork**

Implementing ICU sleep protocols is imperative in improving clinical outcomes by preventing delirium. A culture change by a collaborative effort between ICU physicians, nurses, and ancillary staff is vital. According to the "Patient Safety and Quality: An Evidence-Based Handbook for Nurses," "Collaboration in health care is defined as health care professionals assuming complementary roles and cooperatively working together, sharing responsibility for

problem-solving and making decisions to formulate and carry out plans for patient care.

Collaboration between physicians, nurses, and other healthcare professionals increases team members' awareness of each other's type of knowledge and skills, leading to continued improvement in decision making" (2008, ch 33). The initial phase of this project was to raise awareness of sleep deprivation and its effect on patient outcomes. A committee was formed to identify and discuss potentially modifiable sleep barriers on the night shift comprised of physicians, nurses, RT's and ICU management. As issues were identified, the committee worked collectively to tackle each barrier using brainstorming. After a list of nonpharmacological and pharmacological strategies and interventions was formulated the committee trialed a small test of change by providing education at staff meetings, posting problems and interventions in the unit, and reviewing the small test of change in the change-of-shift huddle.

What was learned from participating on this committee project was that change is slow and patience and persistence is required. Agreeing upon, coordinating, and implementing and maintaining change requires persistence. And because there is a large staff, rotating schedules, and multiple shifts, changes in an acute care setting happen one small step at a time. It is best said by Cortney Carver, "Big, beautiful change is almost always at the intersection of many small, slow changes" (2018).



### **Discovery Interviews**

Discovery interviews were conducted after the initial steps taken towards improving sleep quality and quantity in a Northern California 20-bed ICU. Collaboration efforts were made in the ICU between the physicians, nursing, pharmacy, and ancillary staff at the start of the project. A committee was formed to identify and discuss potentially modifiable sleep barriers on the night shift. The follow-up discovery interviews were an excellent opportunity to expand on the committee's knowledge regarding barriers encountered thus far.

During the interview with the Medical Director of the Sleep Lab and Pulmonologist, D.T. chronic sleep conditions were discussed. This interview introduced a new look at the problem of sleep deprivation. D.T.'s focus was on preventive care and outpatient referrals. According to D.T., if the population of patients with obstructive sleep apnea (OSA) could be identified early on then manifestations of sleep disorders would reduce chronic conditions (such as congestive heart failure, Diabetes, and pulmonary hypertension) from occurring (2019). Furthermore, the coordination of care is also a problem and is under-resourced. In regards to in-hospital medicine, referrals are lacking from the hospitalists to the outpatient sleep clinic when OSA is diagnosed during hospital admission (D.T., 2019).

In the interview with the Medical Social Worker (MSW) H.C. focused on the lack of resources to manage sleep disorders as well as depression. According to H.C., this Northern California hospital offers a mindfulness relaxation meditation class and a yoga class for health, but they are contracted out to a third party and cost an extra fee (2019). Some members can't afford this. In regards to depression, there is a delay in treatment in the outpatient mental health department, and patients are experiencing a long waiting period to begin treatment (H.C.,

2019). Regarding inpatient, during the MSW consult inpatient, the quality of sleep, sleep pattern, and whether the patient is sleeping too much or not enough is always addressed. The MSW was not a part of the committee process but could be a beneficial member for future input and problem-solving.

The final discovery interview with the Quality Department (C.G. & K.L., 2019) brought to light many issues in implementing quality improvement in a hospital setting. First, no matter what the improvement project, quality is often looked at as the ‘police arm’ of the change process which must be stressful. Second, the quality team is focused on thousands of patients while we, in bedside nursing, are focused on only one or two patients at a time. Quality sees and responds to the big picture, the overall results, and overall outcomes, while we manage the immediate problem. Third, Quality focuses on reducing patient harm based on which equates to lowering hospital expenses through quality initiatives. The quality members was not a part of the committee process but would be a beneficial member to bring clarity to the big picture of patient care.

Overall, we gained much insight through the discovery interview process – the incorporation of preventive care, the lack of resources in managing sleep disorders, and the lack of cooperation between nursing and quality are just a few. For the future, these interviews can help guide us as we journey through the process of implementing a sleep promotion program to facilitate healing and prevent delirium.

### **Caritas 6 & 8**

Caritas process 6 is “creatively using self and all ways of knowing as part of the caring processes; engaging in the artistry of caring-healing practices” (Watson, 2007). Caritas process

6 was incorporated into the implementation of a sleep promotion program to facilitate healing and prevent delirium by creating caring-healing practices for adults and their families, as well as in the approach to bedside nursing and physicians by educating them regarding the incorporation of a personal practice that facilitates uninterrupted sleep times for the patients in the ICU. The committee working on this goal provided creative brochures at staff meetings posted problem and intervention poster boards within the unit and reviewed small tests of change in the change-of-shift huddle. The ultimate goal is to reduce or eliminate the incidence of delirium related to in-hospital stays as an act of caring-healing practice, and through the use of creative problem solving, the initiative has the chance to make an impact on some level (Watson, 2007).

Caritas process 8 is creating a “healing environment at all levels, whereby wholeness, beauty, comfort, dignity, and peace are potentiated” (Watson, 2007). It is the committee’s goal that the physicians and nursing staff’s view of a healing and peaceful environment related to the sleep needs of the patient changes. There are many practices in the ICU that cause sleep disturbances which leads to a higher risk of delirium. A constructive conversation is needed to engage health practitioners regarding a sleep-promotion program. Furthermore, the dignity of those who are inadvertently increasing the risk of delirium in this patient population needs to be preserved; it is also to be assumed that the physicians and nursing staff have the best intentions for the patient. By incorporating this sleep-promotion program, a healing environment is created on multiple levels - patient, families, and health care providers; it is imperative that we change and unify our beliefs towards evidence-based practice for preventing delirium in hospitalized patients.

### **Interprofessional Analysis**

“Interprofessional collaboration is defined as practice and education where individuals from two or more professional backgrounds meet, interact, learn together, and practice with the client at the center of care” (Prentice et al., 2015). In addition, better coordination of care is thought to result from increased communication and understanding of each professional’s role (Prentice et al., 2015). Such interprofessional collaboration leads to the bringing together of diverse perspectives using knowledge and experience to understand and solve a range of issues. Furthermore, this diversity of perspective allows a problem to be addressed from multiple angles.

The issue of sleep deprivation in the ICU is a shared responsibility. The committee formed to address the issue of sleep deprivation in the ICU was comprised of physicians, nurses, RT’s and ICU management; physicians direct care, nurses implement care, and ancillary staff supports the goals of care. These perspectives were valuable but were within the confines of the ICU. As I went through the process of the discovery interviews, I realized that the problem-solving task would benefit by incorporating the Quality team as well as the Sleep-Lab physician. These additions would not only bring additional knowledge and experience to the team but broaden the scope of the issue to include a preventative perspective into the mix. This broadening would entail considering the issue of sleep deprivation before it gets to the ICU – maybe before it becomes an issue in the patient’s life.

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