



ASSOCIATION OF SLEEP AND FATIGUE WITH DECISION REGRET AMONG CRITICAL CARE NURSES

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CNE 1.0 Hour

Notice to CNE enrollees:

A closed-book, multiple-choice examination following this article tests your understanding of the following objectives:

1. Discuss the relationship between sleep disturbances and decision regret.
2. Discuss the consequences of sleep disturbances for critical care nurses and their patients.
3. List at least 3 ways to combat sleep disturbances.

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Background The effects of inadequate sleep on clinical decisions may be important for patients in critical care units, who are often more vulnerable than patients in other units. Fatigued nurses are more likely than well-rested nurses to make faulty decisions that lead to decision regret, a negative cognitive emotion that occurs when the actual outcome differs from the desired or expected outcome.

Objectives To examine the association between selected sleep variables, impairment due to fatigue, and clinical-decision self-efficacy and regret among critical care nurses. Decision regret was the primary outcome variable.

Methods A nonexperimental, descriptive design and extant measures were used to obtain data from a random sample of full-time nurses. Binary logistic regression models were used to examine the association between sleep variables, fatigue, and clinical-decision self-efficacy and regret. The discrimination of the models was compared with the *C* statistic, the area under the receiver operating characteristic curve.

Results A total of 605 nurses returned the questionnaires (17% response rate). Among these, decision regret was reported by 157 of 546 (29%). Nurses with decision regret reported more fatigue, more daytime sleepiness, less intershift recovery, and worse sleep quality than did nurses without decision regret. Being male, working a 12-hour shift, and clinical-decision satisfaction were significantly associated with decision regret (*C* statistic, 0.719; SE, 0.024).

Conclusion Nurses who experience impairments due to fatigue, loss of sleep, and inability to recover between shifts are more likely than unimpaired nurses to report decision regret. (*American Journal of Critical Care*. 2014;23:13-23)

The role of sleep loss and fatigue on cognitive performance has received increased attention recently.¹⁻⁴ Impairments in higher level domains of executive function and decision making have been noted in health care providers who practice during extended and nighttime workshifts.⁵⁻⁸ Inadequate sleep increases the risk for errors and near-miss errors in judgment, the use of faulty decision algorithms, and poor patient outcomes.^{5,6,8,9} When faced with making decisions about patient care, a nurse may make the wrong decision, leading to adverse patient outcomes and causing decision regret for the nurse. Decision regret is a negative cognitive emotion that occurs when the actual outcome and the desired or expected outcome differ and reflects concerns that the wrong decision had been made.^{10,11} The amount of decision regret is proportional to the difference between the actual and desired outcomes.^{12,13} Although decision regret reflects previous decisions and adverse outcomes, it may also contribute to work-related stress and compromise patient safety in the future.^{14,15}

Inadequate sleep increases the risk for errors and poor outcomes for patients.

The effects of inadequate sleep and decision regret among health care providers may be especially important for patients in critical care units (CCUs). These patients are often more vulnerable to health care error than are patients in other units because

CCU patients often have illness coupled with unstable clinical status and the frequent need for high-risk medications and interventions.¹⁶ Of the 5 million patients admitted to CCUs in the United States each year, all experience at least 1 preventable adverse event.¹⁷ Of note, the rate of preventable adverse drug events in CCUs is twice the error rate in non-CCU settings.¹⁸

Approximately one-fifth (19%) of medication errors in critical care are potentially life threatening, and almost half (42%) warrant the use of additional life-sustaining intervention.¹⁹

Because critical care nurses provide most of the care in the CCU, they must remain alert to provide safe care and recognize subtle changes in a patient's condition. However, fatigued nurses may make errors in clinical judgment or administration of

medications, or may not intercept errors made by others. Inadequate sleep, an inevitable consequence of extended work shifts (ie, ≥ 12 hours), contributes to loss of situational awareness and creativity, compromised problem solving and decision making,²⁰ and decreased alertness on duty, further jeopardizing patients' safety.⁶ Therefore, identifying human factors associated with minimizing errors and maximizing patient safety is critical.

The aims of our study were to describe selected sleep and fatigue variables (ie, sleep quality, daytime sleepiness, sleep debt, drowsiness and sleep episodes at work, acute and chronic fatigue, and intershift recovery); explore the prevalence of clinical-decision regret experienced by critical care nurses when fatigued; and examine the effects of sleep, impairment due to fatigue, degree of intershift recovery, and clinical-decision self-efficacy (confidence and satisfaction) on decision regret among these nurses. Decision regret associated with sleep deprivation may contribute to increased stress and impaired decision making among nurses and so lead to adverse outcomes for patients.

Conceptual Framework

The conceptual framework for this investigation was the model of impaired sleep²¹ in which sleep loss associated with lifestyle factors (eg, employment demands, caregiving responsibilities, environmental stimuli) or health-related issues (eg, sleep-related breathing disorders, pain, pulmonary or gastrointestinal problems) increases a person's risk for adverse outcomes. Sleep loss associated with either inadequate or disrupted sleep increases the risk for adverse outcomes in physiological, cognitive-behavioral, emotional, and social responses²¹ and affects the ability to engage in effective decision making. This

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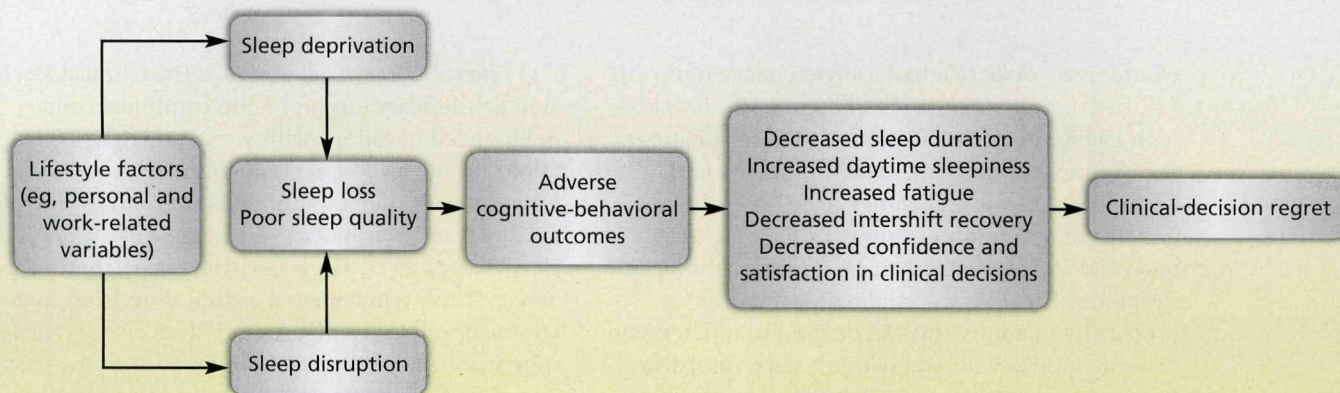


Figure 1 Conceptual framework for examining decision regret.

model has been used in previous studies^{22,23} on nurses' fatigue and provides the framework for examining the human factors of sleep loss (sleep quality, duration, and fragmentation), fatigue and inter-shift recovery, and the effects of inadequate sleep, acute and chronic fatigue, and intershift recovery on clinical-decision self-efficacy (confidence, satisfaction, and decision regret). Decision regret was the primary outcome variable (Figure 1).

Methods

A nonexperimental, descriptive design was used to examine selected sleep variables, impairment due to fatigue, and clinical-decision regret among critical care nurses. A questionnaire was sent to a sample of nurses generated from the membership list of the American Association of Critical-Care Nurses.

Sample

With decision regret as the primary outcome variable, a power analysis was completed to determine the desired sample size. On the basis of previous research on health care providers' decision regret,^{24,25} the assumption was that 40% of respondents would express regret. The goal was to find a difference between nurses who expressed regret and nurses who did not in the mean value of any continuous variable of 10%, when the standard deviation of that variable was 40% of the mean value. For a 2-tailed $\alpha = .05$ with 80% power, the study would require 530 nurses. If the assumed response rate to the mailing was 15%, the survey should be mailed to 3500 nurses.

Potential participants were recruited by using the membership list of full-time critical care nurses practicing as staff nurses. A list of 3500 nurses was randomly generated from approximately 14 000 full-time nurses (working at least 36 h/wk). Because staff nurses were the focus of the study, advanced practice nurses, nurse managers, and nurses in specialized

roles such as discharge planning were not included. A total of 737 questionnaires were returned (21%) within the data collection period. However, 132 questionnaires were excluded because of late returns or because respondents did not meet the inclusion criteria (ie, no longer practicing in critical care or employed in a full-time position). Thus, a total of 605 questionnaire packets (17%) were available for analysis, a typical response rate for nonincentivized, mailed surveys among health care professionals.²⁶

Instruments

Self-reports on characteristics and questionnaires were used to collect information on personal and work-related data, sleep quality, daytime sleepiness, sleep quantity, and clinical-decision self-efficacy and decision regret.

Pittsburgh Sleep Quality Index. Subjective sleep quality was measured by using the Pittsburgh Sleep Quality Index.²⁷ The index consists of 19 items that yield scores on 7 subscales (sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction). The score for each item is from 0 to 3. Additionally, the subscale scores are used to compute a global score (0 to 21), with higher scores indicative of poor sleep quality. Computed global scores greater than 5 have a diagnostic sensitivity of 89.6% and a specificity of 86.5% to differentiate between good and poor sleepers²⁷ and have been substantiated with polysomnographical sleep measures.²⁷ Internal consistency coefficients of 0.69 to 0.81 (Cronbach α) have been reported for various populations,²⁸⁻³¹ including shift workers.^{22,24,32} The internal consistency coefficient in the study reported here was 0.76.

Epworth Sleepiness Scale. The severity of daytime sleepiness was evaluated by using the Epworth Sleepiness Scale.³³ Nurses were asked to indicate if they

The Pittsburgh Sleep Quality Index was used to measure subjective sleep quality.

would never doze (0), had a slight chance of dozing (1), had a moderate chance of dozing (2), or had a high chance of dozing (3) in 8 common situations (eg, sitting quietly after a meal, riding in a car). Total scores on the scale range from 0 to 24; scores greater than 10 indicate abnormal daytime sleepiness, and scores greater than 16 suggest pathological sleepiness. The scale is a valid measure of sleep propensity in adults and can be used to differentiate between groups with and without sleep disorders.³⁴ Both internal consistency reliability (Cronbach α = 0.73-0.88) and stability (r = 0.82) of the Epworth scale have been established.^{22,35} The reliability coefficient in the study reported here was 0.80.

Sleep Quantity Assessment. The Rosenkind³⁶ formula for calculating sleep debt was used to assess the amount of sleep obtained among the respondents. Nurses were asked to report the amount of sleep obtained each night for 5 consecutive nights, starting from the day that the questionnaire packet was received. The 5 consecutive nights included work days and days off. This amount was totaled to determine the overall amount of sleep obtained within a 5-day period (step 1). In addition, nurses were asked to think about the number of hours of sleep obtained when they felt the most alert and performed their best. If this amount was unknown, they were instructed to report 8 hours. This amount was multiplied by 5 to determine the amount of sleep required in

a 5-day period for optimal performance (step 2). The difference between the amount of sleep obtained and the amount of sleep required for optimal performance reflected the degree of sleep debt experienced by the nurses.

Occupational Fatigue, Exhaustion, and Recovery Scale. The Occupational Fatigue, Exhaustion, and Recovery Scale³⁷⁻³⁹ was used to assess work-related fatigue among nurses employed in shiftwork positions. The nurses responded to 15 questions used to compute standardized scores ranging from 0 to 100. When quartile cut points are used, the level of acute fatigue, chronic fatigue, and intershift recovery can be interpreted as low (0-25), low/moderate (26-50), moderate/high (51-75), and high (76-100).³⁹

The subscales of the instrument have documented internal reliability (Cronbach α > 0.84) and face, construct, and discriminant validity, with coefficients (Cronbach α) ranging from 0.77 (chronic) to 0.89 (intershift recovery).^{38,39} The reliability coefficients obtained in the study reported here were similar (Cronbach α = 0.81-0.83).

Clinical Decision Self-Efficacy. The Clinical Decision Self-Efficacy questionnaire combined brief open-ended questions with visual analogue scales (VAS) for nurses to rate their confidence in and satisfaction with their clinical decisions and to provide examples of clinical decisions made when alert and sleepy. In order to assess decision regret, they were asked, "Have you regretted a clinical decision that you made at work when sleepy?" (yes or no). Nurses were instructed to respond on the basis of the past 7 workdays before they had received the questionnaire packet.

A 100-mm horizontal VAS from 0 (no confidence) to 100 (total confidence) was used to measure perceptions of confidence in clinical decisions made when sleepy. A second 100-mm horizontal VAS with anchors of 0 (no satisfaction) to 100 (total satisfaction) was used to measure satisfaction in clinical decisions made when sleepy. Higher scores reflect greater clinical-decision self-efficacy. Because this questionnaire was developed specifically for this study, psychometric evaluation has not been performed. However, VAS scores are considered reliable, valid, and sensitive self-report measures of subjective experiences.⁴⁰ In addition, because of their ease of completion and convenience, VASs are not burdensome for respondents to complete.⁴¹

Procedure

The critical care nurses in the random sample (N = 3500) were mailed a questionnaire packet with a letter of invitation to participate in the study. The cover letter explained the purpose of the study, the time commitment involved, and the voluntary nature of the study. No incentives for completing the questionnaire packet were provided. Potential participants were requested to return their completed questionnaires in a prepaid, self-addressed envelope within 30 days of the receipt date. Questionnaires returned after this date were not included in the analysis. This research protocol was approved by the human research review committee at Grand Valley State University, Grand Rapids, Michigan.

Data Management and Analysis

Graduate research assistants coded and entered data into a database created for the study. After an assessment for entry errors, all data were transferred into the SPSS 19.0 (IBM SPSS Statistics) for statistical analyses. Univariable comparisons were made by using t tests, the Fisher exact test, and χ^2 analysis as appropriate. Variables were first checked for multicollinearity by using linear regression. No pair of variables showed significant multicollinearity.

(maximum variance inflation factor <1.1) Then binary logistic regression with forward selection and backward selection was used to confirm the models' variables; 3 separate models for predicting decision regret were constructed. The first model was constructed solely from the measures of sleep (perception of poor sleep quality, daytime sleepiness score, sleep debt, acute fatigue score, chronic fatigue score, and intershift recovery score; Figures 2A-2F). In order to assess the effect of nurses' demographics and work and life characteristics, the second model was created by entering all the sleep-related variables and all of the nurses' characteristics (Table 1). The final model consisted of the 2 previous sets of variables plus the nurses' satisfaction and confidence in their decisions (Figures 2G and 2H). Results were considered significant if $P < .05$ and confidence intervals excluded 1. Discrimination of the models is presented as the C statistic (the area under the receiver operating characteristic curve) with the standard error of the mean.

Results

Characteristics of the Respondents

A total of 605 full-time employed critical care nurses returned the survey. Of these, 546 (90%) answered the question on decision regret. Among these 546 nurses, 157 (29%) reported decision regret. Nurses who had decision regret were more likely to work nights and to work 12-hour shifts (Table 1) than were nurses without decision regret. Otherwise the personal and work-related characteristics of the nurses with and without decision regret were similar (eg, race, sex, age, family, and hospital unit). However, nurses with decision regret reported significantly more acute fatigue (regret: mean, 71.17; SD, 16; no regret: mean, 65.95; SD, 20) and daytime sleepiness (regret: mean, 10.00; SD, 4; no regret: mean, 8.39; SD, 4) and significantly less intershift recovery (regret: mean, 42.44; SD, 22; no regret: mean, 50.17; SD, 25) and poor sleep quality (regret: mean, 8.34; SD, 3; no regret: mean, 7.56; SD, 3) than did the nurses without decision regret (Figures 2A-2F).

When binary logistic regression was used to adjust for the several indicators of sleep, higher daytime sleepiness, less sleep deprivation, and lower amounts of recovery were independently associated with decision regret (Table 2). After the sleep indicators were combined with the nurses' personal and work-related characteristics, intershift recovery and daytime sleepiness scores remained independently associated with decision regret. Male nurses were also more likely to express decision regret than were female nurses (Table 2).

The final regression model included the satisfaction and confidence variables (Table 2). The discrimination of the model improved from C statistic = 0.628 (SE, 0.027) to C statistic = 0.719 (SE, 0.024) with the addition of the satisfaction variable. Confidence was not significant as a predictor variable for decision regret. Nurses who were male, worked 12 hours or more, and were less satisfied in their decisions were more likely than other nurses to report decision regret.

Discussion

Registered nurses play a pivotal role as members of the health care team, but fatigued and sleep-deprived critical care nurses put their patients and themselves at serious risk. In our study, the majority of nurses reported moderately high fatigue, significant sleep deprivation, and daytime sleepiness, all of which affect their ability to be alert, vigilant, and safe. Furthermore, the nurses were not likely to sufficiently recover from their fatigue-related states during nonwork periods. Nurses with poorer intershift recovery (failure to recover from acute fatigue) are at greater risk than those with better recovery for becoming chronically fatigued³⁹; experiencing injuries, illnesses, and absenteeism⁴²; and making impaired decisions.¹

Acute and chronic sleep deprivation adversely affects cognitive function,^{3,43} most noticeably working memory, alertness, attention, vigilance, and decision making.³ The prefrontal cortex of the brain, the area responsible for complex cognitive processes, is thought to be especially vulnerable to the effects of sleep loss² when planning, coordinating, and self-regulating behaviors are required. Further, sleep deprivation has a global effect on cognition, reducing response times, increasing risk-taking behaviors (possibly due to alterations in expected gains and losses), and altering normal affective processing.² Detrimental effects of chronic sleep loss include deterioration in performance,⁴ especially during extended periods of wakefulness. This effect is especially a concern for critical care nurses who are providing care for seriously ill patients with compromised resilience and an inability to protect themselves from poor decisions of providers or from health care mishaps.

We used 3 separate models to evaluate the effects of sleep, nurses' characteristics, and satisfaction and confidence on decision regret. Model 1 indicated that less intershift recovery, greater sleep debt, and

A total of 29% of nurses reported decision regret and were more likely to work nights and 12-hour shifts.

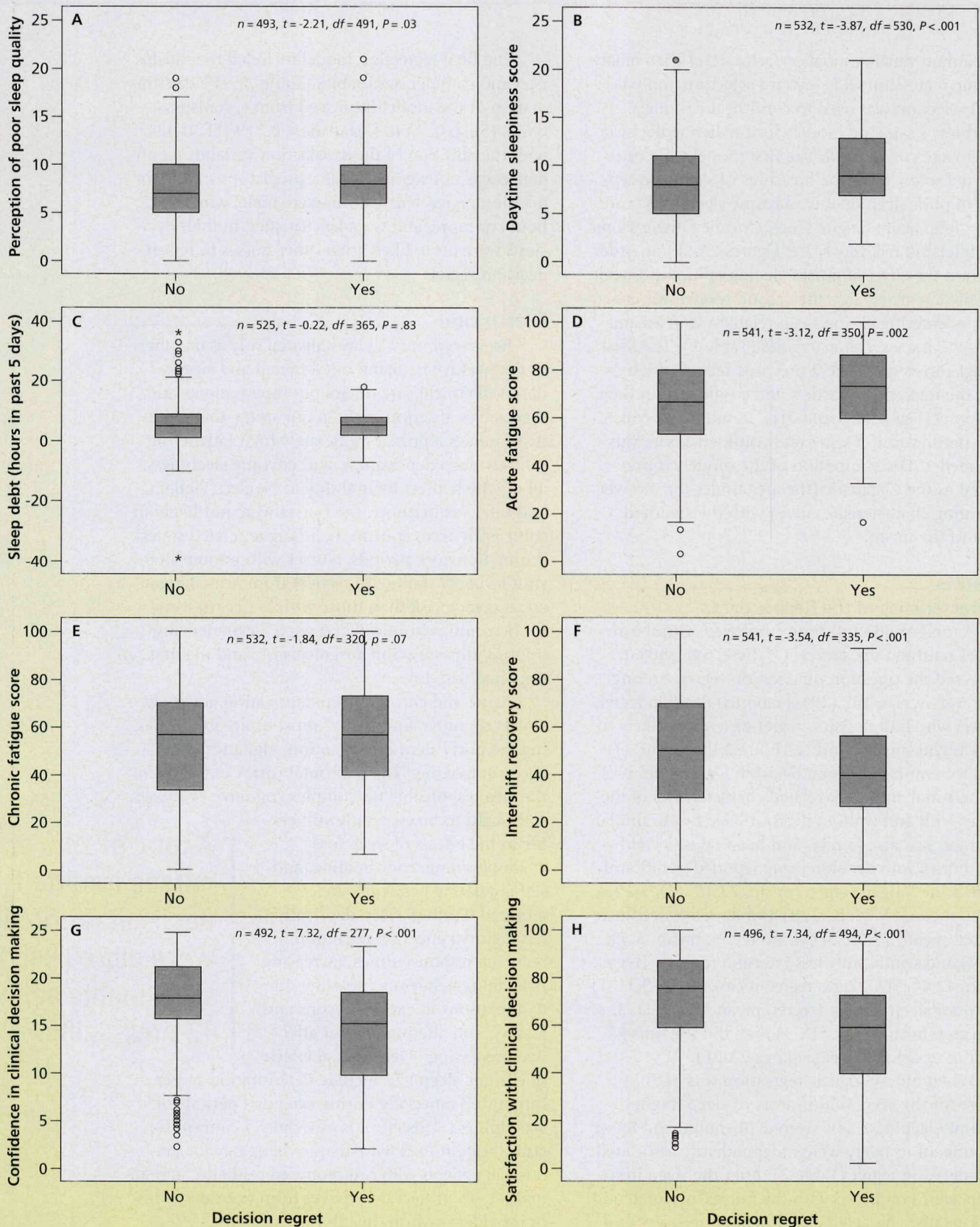


Figure 2 Box and whisker plots showing median, intraquartile range, 95% CIs, and outliers of sleep characteristics and decision making with decision regret. A, Perception of poor sleep quality (Pittsburgh Sleep Quality Instrument). B, Daytime sleepiness score (Epworth Sleepiness Scale). C, Sleep debt (Sleep Quantity Assessment). D, Acute fatigue score (Occupational Fatigue, Exhaustion, and Recovery Scale: Acute Subscale). E, Chronic fatigue score (Occupational Fatigue, Exhaustion, and Recovery Scale: Chronic Subscale). F, Intershift recovery score (Occupational Fatigue, Exhaustion, and Recovery Scale: Intershift Recovery Subscale). G, Degree of confidence in decision making (visual analogue scale). H, Degree of satisfaction with decision making (visual analogue scale).

Table 1
Characteristics of nurses who participated in the study

Characteristic	Total		Decision regret				P
	No. ^a	Mean (SD)	Yes	Mean (SD)	No	Mean (SD)	
	No.	n (%)	No.	n (%)	No.	n (%)	P
Age, y	544	46 (10)	157	45 (10)	387	46 (10)	.84
Years as registered nurse	546	20 (10)	157	20 (10)	389	20 (10)	.65
Years as critical care nurse	542	17 (9)	157	17 (9)	385	17 (9)	.29
Commute time, min	544	28 (16)	157	29 (15)	387	27 (16)	.17
Female	544	465 (85)	156	126 (81)	388	339 (87)	.06
White race	546	475 (87)	157	137 (87)	389	338 (87)	.99
Agency employment	540	15 (3)	155	6 (4)	385	9 (2)	.38
Float	536	23 (4)	153	6 (4)	383	17 (3)	.99
Living arrangement: single	546	135 (25)	157	43 (27)	389	92 (24)	.38
Children	542		157		389		.13
0		260 (48)		70 (45)		190 (49)	
1		127 (23)		36 (23)		91 (23)	
2		99 (18)		26 (17)		73 (19)	
>2		56 (10)		25 (16)		35 (9)	
Lives with aged parent	545	88 (16)	157	22 (14)	388	66 (17)	.44
Hospital unit	546		157		389		.68
Combined intensive/critical care unit		150 (27)		41 (26)		109 (28)	
Multiple units		76 (14)		19 (12)		57 (15)	
Intensive care		73 (13)		26 (17)		47 (12)	
Surgical intensive care unit		48 (9)		16 (10)		32 (8)	
Cardiovascular recovery		36 (7)		11 (7)		25 (6)	
Other		163 (30)		44 (28)		119 (31)	
Shift length	544		157		389		.01
12 hours		475 (87)		144 (92)		331 (85)	
8 hours		53 (10)		4 (2)		4 (1)	
Other		16 (3)		9 (6)		54 (14)	
Shift type	540		156		384		.047
Day		311 (58)		77 (49)		234 (61)	
Night		156 (29)		55 (35)		101 (26)	
Rotating		58 (11)		17 (11)		41 (11)	
Evening		15 (3)		7 (4)		8 (2.1)	
Additional employment	528	111 (21)	153	26 (17)	375	85 (23)	.16

^a Not all participants answered all the questions, so some variables have fewer than 546 responses.

more daytime sleepiness were associated with greater decision regret (Table 2). Within a 5-day period, almost three-quarters of the study participants were sleep-deprived, losing at least a day (8 hours) or more of sleep during this time. Moreover, the likelihood for decision regret was significantly higher among those with sleep debt than among those without (Table 2). These findings are consistent with those of other studies^{4,7,8} in which persistent and chronic sleep debt was associated with devastating effects on performance and with adverse health and safety consequences.

When nurses' characteristics were added (model 2), daytime sleepiness and intershift recovery remained significantly associated with decision regret, but being male replaced sleep debt (Table 2). Possibly, this switch from sleep-related variables to personal and work-related characteristics was due to sex and professional socialization norms or to different reactions of male and female nurses to sleep debt.

Our final model, which showed good discrimination (C statistic, 0.719; SE, 0.024), being male, longer shifts (≥12 hours), and decreased satisfaction

Table 2
Factors associated with decision regret

Factor	Statistic ^a					
	B	SE	Wald	P	Exp (B)	95% CI
Model 1^b						
Intershift recovery	-0.013	0.005	6.737	.009	0.988	0.978-0.997
Daytime sleepiness	0.079	0.026	8.939	.003	1.082	1.028-1.140
Sleep debt ^c	0.337	0.141	5.705	.02	1.400	1.063-1.845
Constant	-0.347	0.483	0.518	.47	0.707	
Model 2^d						
Intershift recovery	-0.010	0.004	4.613	.03	0.990	0.982-0.999
Daytime sleepiness	0.067	0.024	7.656	.006	1.069	1.020-1.121
Sex (male)	0.681	0.269	6.393	.01	1.975	1.165-3.347
Constant	-1.196	0.363	10.88	.001	0.302	
Model 3^e						
Sex (male)	0.686	0.283	5.875	.02	1.985	1.140-3.455
Shift length (12 h)	0.887	0.353	6.299	.01	2.427	1.214-4.850
Satisfaction	-0.031	0.005	42.60	<.001	0.969	0.960-0.978
Constant	0.259	0.411	0.397	.53	1.296	

^a Degrees of freedom = 1 for all factor analyses.

^b Decision regret analyzed with sleep variables only (C statistic, 0.628; SE, 0.027).

^c Per 8-hour increments of debt in previous 5 days.

^d Decision regret analyzed with sleep variables and critical care nurses' characteristics (C statistic, 0.632; SE, 0.026).

^e Decision regret analyzed with sleep variables, critical care nurses' characteristics, and decision confidence and satisfaction (C statistic, 0.719; SE, 0.024).

in clinical decision making were associated with increased decision regret (Table 2, model 3). A shift length of 12 hours or more may contribute to a variety of sleep disturbances, but the longer shifts, not the resultant sleep disturbances, are what lead to decision regret. Evaluation of the effects of naps during longer shifts is needed to determine how taking a nap affects sleep parameters, decision regret, and patients' outcomes. Lower levels of satisfaction in making clinical decisions may reflect previous incorrect decisions leading to adverse outcomes.

Although our findings can be a catalyst for further investigation, they also have implications for health care providers and the providers' employers. Both critical care nurses and their employers must not only acknowledge the impact of fatigue, sleep deprivation, and excessive daytime sleepiness on clinical performance and patients' outcomes but also engage in strategies to mitigate these impairments. Strategies at the individual level include practicing good sleep hygiene; taking naps to decrease the number of consecutive hours awake; and avoiding extended workshifts, excessive consecutive workdays, and shifts that interfere with circadian sleep cycles (eg, 3 AM to 3 PM) and the ability to recover between workshifts. Because sleep complaints are more common in middle-aged and older adults, particularly women,⁴⁴⁻⁴⁸ than in younger adults and children, proactive intervention is required to ensure that critical care nurses are fit for duty and can make decisions that are critical for patients' safety.

Likewise, health care employers should implement scheduling models that maximize management of fatigue, ensure that support resources for clinical decisions are available, and encourage the use of relief staff to provide completely relieved work breaks and strategic naps. In addition, education on how to manage fatigue and incorporation of fatigue countermeasures should be routine practices in health care organizations.⁴⁹ By working together to manage fatigue, critical care nurses and employers can ensure that patients receive care from alert, vigilant, and safe employees.

Limitations

We recognize that our instruments and sample size may limit the generalizability of our findings. Because self-report methods were used to collect data with a recall period of 5 to 30 days for selected sleep-related variables and clinical-decision regret, the subjective nature of the data is a potential limitation. However, the majority of the instruments used are extant measures with established psychometric properties, characteristics that enhance confidence in our results. Likewise, our sample size represents only 17% of the sampling frame and may not be representative of nurses who chose not to respond or who did not belong to the American Association of Critical-Care Nurses. We used a straightforward, rigorous study design to enhance the representativeness of the respondents. Although only 29% of respondents had decision regret, instead of our

estimated 40%, the study had sufficient statistical power, after all adjustments, to indicate 3 independent variables associated with decision regret. Future studies are needed to examine the association between sleep, decision regret, and adverse events, including patients' mortality.

Conclusion

Several studies have indicated a link between adverse outcomes, fatigue, and sleep loss. We extended this work by adding the concept of clinical-decision self-efficacy (confidence, satisfaction, and decision regret) and used decision regret as the primary outcome variable. Critical care nurses who experience impairments due to fatigue, poor sleep, and inability to recover between shifts are more likely than unimpaired nurses to report clinical-decision regret. Decision regret was most common among nurses who are male, work 12-hour shifts, and have lower levels of satisfaction with their clinical decisions.

FINANCIAL DISCLOSURES

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CNE Test Test ID A142301: Association of Sleep and Fatigue with Decision Regret Among Critical Care Nurses

Learning objectives: 1. Discuss the relationship between sleep disturbances and decision regret. 2. Discuss the consequences of sleep disturbances for critical care nurses and their patients. 3. List at least 3 ways to combat sleep disturbances.

1. Which of the following is the rate of preventable adverse drug events in critical care units?

- a. Half that of noncritical care units
- b. About the same as noncritical care units
- c. Twice that of noncritical care units
- d. Three times that of noncritical care units

2. Which of the following is a potential consequence of nurses' fatigue?

- a. Failure to intercept errors made by others
- b. Inability to assess patient conditions accurately
- c. Poor interpersonal skills
- d. Decreased ability to accurately document

3. Nurses who reported decision regret were more likely to work which of the following shifts?

- a. Eight-hour shifts
- b. Rotating shifts
- c. Day shifts
- d. Night shifts

4. Which of the following was reported significantly more by nurses with decision regret?

- a. Daytime napping, shifts worked consecutively, and increased REM sleep
- b. Daytime sleepiness, acute fatigue, less intershift recovery, and poor sleep quality
- c. Night time alertness, chronic fatigue, and decreased REM sleep
- d. Acute fatigue, longer shifts, and daytime napping

5. Most nurses in this study reported which of the following?

- a. Moderately high fatigue, significant sleep deprivation, and daytime sleepiness
- b. Little fatigue, no sleep deprivation, and daytime alertness
- c. Very high fatigue, little sleep deprivation, and daytime sleepiness
- d. Daytime sleepiness, excessive sleep at night, and high fatigue

6. Sleep deprivation has a global effect on cognition with an alteration of which of the following?

- a. Long-term memory
- b. Assessment ability
- c. Affective processing
- d. Visual processing

7. Which of the following factors were associated with greater decision regret?

- a. Less intershift recovery, decreased REM sleep, and less daytime sleepiness
- b. Longer intershift recovery, more daytime sleepiness, and less sleep debt
- c. Less intershift recovery, greater sleep debt, and more daytime sleepiness
- d. More daytime sleepiness, more night time alertness, and longer intershift recovery

8. Almost 75% of the participants lost how much sleep within a 5-day period?

- a. Eight hours
- b. Four hours
- c. Seven hours
- d. Nine hours

9. Which of the following is true for nurses with sleep debt compared to those without sleep debt decision regret?

- a. The same
- b. Higher if they also had less intershift recovery
- c. Slightly higher
- d. Significantly higher

10. Which of the following may be a contributor to decision regret?

- a. Both sleep disturbance and a longer shift
- b. Longer shift
- c. Intershift recovery
- d. Sleep disturbances

11. Individual strategies to combat sleep disturbances include which of the following?

- a. Avoiding night shift or splitting shifts and taking naps
- b. Practicing good sleep hygiene, avoiding extended shifts or excessive consecutive days, and taking naps
- c. Taking naps, drinking a caffeinated beverage before sleep, and working several night shifts in a row
- d. Practicing good sleep hygiene, avoiding excessive consecutive shifts, and working at least 12 hours

12. Sleep complaints are more common in which of the following?

- a. Women in their 20s
- b. Men in their 30s
- c. Both sexes equally
- d. Middle aged and older adults, particularly women

Test ID: A142301 Contact hours: 1.0; pharma 0.0 Form expires: January 1, 2017. Test Answers: Mark only one box for your answer to each question.

1. ☐ a	2. ☐ a	3. ☐ a	4. ☐ a	5. ☐ a	6. ☐ a	7. ☐ a	8. ☐ a	9. ☐ a	10. ☐ a	11. ☐ a	12. ☐ a
☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b	☐ b
☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c	☐ c
☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d	☐ d

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