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A Study of Sleep Quality Among Nurses and Its Correlation With Cognitive Factors

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The objective of this study was to evaluate sleep quality and its relationship to cognitive factors among nurses. Sleep quality among nurses is an important issue, which requires more extensive study. Its correlation with cognitive ability has not been sufficiently considered. Five hundred forty nurses (66.3% female) working in 6 hospitals were selected as the sample of the study. Results show that nurses do not experience good quality of sleep. That is, 77.4% of the sample population of nurses have a poor quality of sleep, and nurses working the night shift have more sleep problems than other nurses. The results show that there is a relationship between dysfunctional beliefs and attitudes about sleep and metacognitive process and the quality of sleep, and that these variables can predict sleep quality. Based on the results of the study, it can be said that cognitive and metacognitive processes play an important role in sleep quality. Lack of sufficient sleep can create numerous problems for nurses and patients. Attention to the role of cognitive and metacognitive processes can help improve the sleep quality of nurses. **Key words:** *cognitive processes, insomnia, metacognitive processes, sleep quality*

NURSING is an occupation that involves challenging activities with a high level of responsibility. Nurses who work long hours and various work shifts can experience disruptions, such as sleep disturbance. Some studies indicate that there is a low quality

of sleep among nurses.¹ Sleep quality among nurses is an important issue, which needs more focused attention, because sleep deprivation can have adverse effects on the performance and efficiency of nurses. This may lead to clinical mistakes and adverse events. Moreover, sleep deprivation can have negative impacts on the individual's health.² It can lead to complications, such as irritability, bad moods, reduced communication skills, and a breakdown of emotional coping skills in the work environment.³ Studying and learning about sleep quality of nurses is a step toward reducing the likelihood of these problems and work accidents. A related or underlying issue may involve the work shifts of nurses; the relationship between work shift and sleep quality has been evaluated in previous research, and this relation has been confirmed.⁴⁻⁶

Some argue that nurse sleep disturbances are due to disruption in the synchronous relationship between the body's internal clock and the environment, which is attributed to

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the work shift.⁷ However, it may be that other factors play a role in the development of sleep problems among nurses. Focusing solely on shift work cannot provide an accurate and precise evaluation of sleep quality. Keeping this point in mind, the current study also focuses on cognitive and metacognitive processes.

Cognitive processes, such as dysfunctional beliefs and attitudes about sleep, play a major role in sleep disturbances, particularly in the intensity of insomnia—a review of previous research shows that this is a significant issue.^{8–10} The nature of these beliefs is clustered around 5 conceptually derived themes: (a) misconceptions about the causes of insomnia (eg, “I believe insomnia is essentially the result of a chemical imbalance”); (b) misattribution or amplification of its consequences (eg, “I am concerned that chronic insomnia may have serious consequences on my physical health”); (c) unrealistic sleep expectations (eg, “I must get 8 hours of sleep to feel refreshed and function well the next day”); (d) diminished perception of control and predictability of sleep (eg, “When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week”); and (e) faulty beliefs about sleep-promoting practices (eg, “When I have trouble sleeping, I should stay in bed and try harder”).¹¹ Inaccurate beliefs and attitudes about sleep are not limited to patients suffering from preliminary insomnia. They are present in other sleep disorders as well.¹⁰ Moreover, dysfunctional beliefs about sleep are considered the main component in many theoretical models of insomnia.^{12–14}

A cognitive process resulting in low self-efficacy is considered to be one of the risk factors for sleep problems.¹⁵ Self-efficacy (defined as personal judgment of how well an individual believes he or she can deal with situations appropriately well) is considered an important factor in commitment to insomnia treatment.¹⁶ People suffering from insomnia have been shown to have maladaptive thought control strategies, which can create vicious cycles, that lead to disturbances in the ability to initiate sleep and maintain it.¹⁷

Ong et al¹⁸ have proposed a 2-level model of arousal in insomnia. In this model, the role of metacognition in insomnia is explained in detail. The metacognitive processes they propose include balanced appraisals, cognitive flexibility, equanimity, and commitment to values. It is assumed that performing these processes can improve insomnia by reducing sleep-related arousal.¹⁸ Metacognitive therapies for insomnia share the common aim of increasing awareness of the mental and physical states that arise when experiencing insomnia symptoms and learning how to shift mental processes to promote an adaptive stance in responding to these symptoms. This stance is characterized by balanced appraisals of sleep expectations.¹⁸ Flexibility in stance is also an important component, consisting of openness, a willingness to adopt a beginner’s mind, and acceptance of a wide range of cognitive and emotional phenomena.¹⁸ Equanimity refers to a stance without attachment or aversion to sleep-related stimuli. For example, one’s reactions to the thoughts “I am having trouble sleeping” and “I am sleeping well” would be much less disparate from a stance of equanimity. This stance would outwardly evince relative calmness and composure in response to sleep-related cues,¹⁸ and commitment to values refers to pursuit of valued living in the context of the range of thoughts and emotions.¹⁸ In one study, it was found that, in comparison to people with normal sleep patterns, people suffering from insomnia have a larger number of metacognitive thought control strategies. These usually involve thought suppression, reappraisal, and worrying.¹⁹

Studying the sleep quality of nurses can provide more knowledge about the factors influencing it. Then, we can pinpoint strategies that can help improve their sleep quality. The study described in this article has been carried out to investigate sleep quality in nurses, and the role played by its cognitive correlates.

A cross-sectional, self-reported study was conducted in 6 hospitals, from June 2018 to September 2018. The hospitals were selected by using a simple random sampling method. Five hundred forty nurses

(66.3% female) working in these hospitals were then selected also through use of a simple random sampling methodology. The screening criteria for being included in the study included not being addicted to drugs or alcohol, having at least 1 year of nursing experience, and willingness to participate in the study. People with a history of chronic diseases, such as cardiovascular and pulmonary disease, and people who were older than 60 years were eliminated from the study.

Based on the nature of this (correlative) study and similar studies, a sample size of 400 was initially considered. However, considering possibilities such as lack of participation or sample attrition, 550 questionnaires were distributed. Ultimately, the data of 540 participants were analyzed. (Ten participants did not participate in the study citing lack of time.) Questionnaires were distributed among the participants, followed by initial explanations about how to complete them. The participants were urged to ask for more explanations if they encountered any problems while completing the questionnaires. In order to follow research principles and ethics, the participants were informed that if they were not willing to participate in the study for any reason, they could leave the study. After they were assured that this information would remain confidential and would be used only for the purpose of the study, participants gave informed consent to have their answers included in the study. The participants completed the questionnaires.

As stated earlier, participating in the study was optional, voluntary, and based on individual informed consent. There was no monetary incentive given for completing the questionnaires. After the researcher explained the study and its objectives, the participants were allowed to answer the questions. The health and safety of the participants during and after the study was the research team's main priority. The study plan was designed and executed by skillful experts, and it did not pose any physical or financial risk for the participants.

In order to carry out the study, the following questionnaires were utilized:

- *Inventory of Dysfunctional Beliefs and Attitudes About Sleep.* This inventory, which was developed by Morin,¹¹ includes 10 items related to inefficient beliefs and attitudes before sleeping, which are assumed to play a role in sleep problems. The participants have to express the extent they agree with each item, based on a Likert spectrum, which ranges from 0 to 10. High scores are related to a higher level of dysfunctional beliefs and attitudes about sleep. The internal consistency of this inventory, measured by use of the Cronbach α coefficient, was reported as 0.77 for the clinical population and 0.79 for the general population.¹¹ In the current study, the Cronbach α coefficient of this inventory was 0.89.
- *The Standard Self-Efficacy for Sleep Scale.* The self-efficacy for sleep scale includes 9 questions based on the 5-option Likert spectrum, giving a score of 5 for the complete certainty of the individual and a score of 1 for the uncertainty of the individual. The reliability of the questions related to the self-efficacy for sleep has been evaluated using the Cronbach α , which was 0.85 for the self-efficacy for sleep scale.²⁰ Obtaining a higher score in this scale indicates a higher self-efficacy for sleep. In the current study, the Cronbach α coefficient calculated for this questionnaire was equal to 0.77.
- *Insomnia Severity Index.* In order to measure the extent of insomnia, this 7-item index was used. It includes questions for evaluating difficulty falling asleep, difficulty staying asleep, waking up too early, satisfaction with the current sleep pattern, sleep problems' interference with daily functioning, the effects of sleep disorder on quality of life, and the level of worrying or distress caused by sleep disorder. Based on the intensity of the corresponding problem, the participant gives a score of 0 to 4 to each item, and the final score of the individual is the sum of

the scores for these 7 questions.²¹ In the current study, the Cronbach α coefficient for this index was 0.90.

- *Pittsburgh Sleep Quality Index.* In order to measure sleep quality and pattern, the Pittsburgh Sleep Quality Index was used. This inventory assesses sleep quality and disturbances over a 1-month interval using 19 questions based on 7 components. Each question can have a score of 0 to 3, and the score of each component can be, at most, a 3. The sum of the scores of these 7 components determines the overall score, which ranges from 0 to 21. Higher scores indicate lower sleep quality. A score higher than 5 indicates poor quality of sleep.²² The reliability of the Pittsburgh Index using the Cronbach α coefficient is 0.8 and its reported retest validity has been reported between 0.93 and 0.98.²³ In the current study, the Cronbach α coefficient for this questionnaire was 0.87.
- *Metacognitive Processes of Sleep Scale.* In order to evaluate metacognitive processes, a new questionnaire was developed, based on the theoretical foundations of the 2-level model of arousal in insomnia proposed by Ong et al.¹⁸ Based on this model, the recommendations and suggestions of experts, and previous research, a scale was developed in the current study to measure metacognitive processes. In order to create the questionnaire, a number of items were extracted from previous studies, forming a questionnaire with 30 questions. The resulting questionnaire was shared with experts in psychology, psychotherapy, psychometry, and health care education. Based on the suggestions of these experts, irrelevant items were eliminated (at this stage, 4 questions were eliminated). The questionnaire was then distributed among the selected population. After data collection, the questionnaire was analyzed using confirmatory and exploratory factor analyses. At this stage, 3 more questions were eliminated, culminating in a confirmed ques-

tionnaire containing 23 questions. Using the results of the factor analysis, 4 factors were extracted. These included balanced appraisals (6 items), cognitive flexibility (6 items), equanimity (4 items), and commitment to values (7 items). The reliability of the final questionnaire was evaluated using the Cronbach α coefficient, which was 0.84 for the entire questionnaire, 0.72 for the first factor, 0.75 for the second factor, 0.70 for the third factor, and 0.71 for the fourth factor.

The Likert spectrum was used for scoring the questionnaire. A score of 1 was allocated to the option of “disagree”, a score of 2 was allocated to the option of “somewhat agree,” a score of 3 was allocated to the option of “agree,” and a score of 4 was allocated to the option of “completely agree.” Overall, the final score of the respondents could range from 23 to 92, and higher scores indicate stronger positive metacognitive processes.

The data collected in the study were analyzed using SPSS-22 software application. In order to describe the data, mean and standard deviation were used. In order to evaluate the relationships between the variables, Pearson’s correlation coefficient test was used, and in order to predict sleep quality and intensity of insomnia based on metacognitive processes, self-efficacy of sleep, and dysfunctional beliefs and attitudes about sleep, multivariate regression analysis based on the enter method was used. In order to compare the mean values in the groups, 1-way analysis of variance was used. Frequencies were compared using the χ^2 test.

RESULTS

Table 1 presents the demographic characteristics of the selected sample and the average score of quality of sleep and intensity of insomnia based on each characteristic.

The selected sample included 540 nurses, among which 358 nurses (66.3%) were female. The average age of the selected sample was 32.02 ± 5.63 years. The results in Table 1

Table 1. Demographic Characteristics, Insomnia Sleep Index, and Sleep Quality (N = 540)

Variable	n (%)	Insomnia Sleep Index Mean \pm SD	Sleep Quality Mean \pm SD
Sex			
Male	182 (33.7)	12.53 \pm 5.10	7.14 \pm 3.08
Female	358 (66.3)	13.38 \pm 5.71	6.84 \pm 3.28
<i>P</i>	.001	.08	.31
Age, y			
20-30	252 (46.7)	14.04 \pm 5.48	7.43 \pm 3.01
30-40	254 (46.9)	12.21 \pm 5.41	6.56 \pm 3.14
40-50	34 (6.29)	13.06 \pm 5.83	6.62 \pm 4.60
<i>P</i>	.001	.001	.008
Nursing experience, y			
1-15	494 (91.5)	13.32 \pm 5.42	7.08 \pm 3.17
16-30	46 (8.5)	10.92 \pm 6.29	5.69 \pm 3.40
<i>P</i>	.001	.004	.005
Shift schedule			
Day	140 (25.92)	12.17 \pm 5.51	5.97 \pm 2.91
Night	170 (31.48)	13.39 \pm 5.63	7.60 \pm 2.99
Rotating	230 (42.59)	13.42 \pm 5.50	6.95 \pm 3.45
<i>P</i>	.001	.12	.001
Marital status			
Single	226 (41.9)	12.41 \pm 5.31	6.64 \pm 3.31
Married	292 (54.1)	13.53 \pm 5.68	7.10 \pm 3.29
Others	22 (4.1)	14.36 \pm 5.42	8.36 \pm 2.94
<i>P</i>	.001	.04	.03
Smoking			
Yes	54 (10)	13.29 \pm 5.68	8.34 \pm 3.31
No	486 (90)	12.79 \pm 5.48	6.82 \pm 3.20
<i>P</i>	.001	.52	.001

show that variables of age, work experience, and marital status are related to the intensity of insomnia; while variables of age, work experience, work shift, marital status, and smoking are related to quality of sleep. That is, nurses with lower age and work experience have more sleep problems; nurses working in the night shift show more sleep problems than other nurses, and nurses who smoke present more sleep problems.

Table 2 presents the quality of sleep and intensity of insomnia for the selected sample.

For the selected sample, the average score of quality of sleep is 6.96 ± 3.20 , indicating a poor quality of sleep. Moreover, the results show that the average intensity of insomnia is 13.09 ± 5.54 . As can be seen from Table 2, 77.4% of the nurses have poor quality of sleep

and 7.4% of them are suffering from severe insomnia.

In order to evaluate the relationship between metacognition, self-efficacy in sleep,

Table 2. Sleep Quality and Insomnia Severity

Variable	Frequency (%)	Explain
Sleep quality		
0-5	122 (22.6)	Good sleeper
6-21	418 (77.4)	Poor sleeper
Insomnia severity		
0-7	104 (19.3)	Normal
8-14	224 (41.5)	Subthreshold
15-21	172 (31.9)	Moderate severity
22-28	40 (7.4)	Severe

and dysfunctional beliefs and attitudes about sleep and quality of sleep and intensity of insomnia, Pearson's correlation coefficient test was used, and the results are presented in Table 3.

The results depicted in Table 3 show that there is a negative correlation coefficient between metacognition and all the subscales of quality of sleep, except for sleep duration. Moreover, there is a negative correlation coefficient between self-efficacy in sleep and all the subscales of sleep quality, except for daytime dysfunction. Furthermore, the results show that there is a positive correlation coefficient between dysfunctional beliefs and attitudes about sleep and other subscales of quality of sleep, except for sleep duration and habitual sleep efficiency. The results of the analysis show that there is a correlation coefficient of -0.28 between the overall metacognition and the overall quality of sleep, and there is a correlation coefficient of -0.48 between overall metacognition and intensity of insomnia. This means that the higher the metacognitive states, the lower the sleep problems and intensity of insomnia. Moreover, there is a correlation coefficient of -0.46 between self-efficacy in sleep and quality of sleep, and there is a correlation coefficient of -0.48 between self-efficacy in sleep and the intensity of insomnia. This means that the lower the level of self-efficacy in sleep, the higher the number of sleep problems and the intensity of insomnia. Moreover, the results in Table 3 indicate that there is a correlation coefficient of 0.19 between dysfunctional beliefs and attitudes about sleep and the quality of sleep, along with a correlation coefficient of 0.25 with the intensity of insomnia. This means that the higher the number of dysfunctional beliefs and attitudes about sleep, the higher the number of sleep problems and the intensity of insomnia.

In order to predict quality of sleep and intensity of insomnia based on metacognitive states, self-efficacy in sleep, and dysfunctional beliefs and attitudes about sleep, multivariate regression analysis based on the enter method

Table 3. Correlations Between Variables

	Subjective Sleep Quality	Sleep Latency	Sleep Duration	Sleep Efficiency	Sleep Disturbances	Sleeping Medication	Daytime Dysfunction	Sleep Quality	Insomnia Severity
Metacognitive									
F1	-0.25^a	-0.22^a	-0.02	-0.08	-0.13^a	-0.06	-0.06	-0.21^a	-0.34^a
F2	-0.24^a	-0.27^a	0.03	-0.07	-0.14^a	-0.28^a	-0.25^a	-0.27^a	-0.40^a
F3	-0.17^a	-0.12^a	0.07	-0.07	-0.10^b	-0.14^a	-0.13^a	-0.13^a	-0.27^a
F4	-0.11^b	-0.10^b	0.01	-0.11^b	-0.23^a	-0.23^a	-0.21^a	-0.19^a	-0.35^a
Total	-0.27^a	-0.24^a	0.02	-0.11^b	-0.21^a	-0.25^a	-0.23^a	-0.28^a	-0.48^a
Self-efficacy	-0.45^a	-0.47^a	-0.22^a	-0.33^a	-0.26^a	-0.10^b	-0.07	-0.46^a	-0.48^a
Beliefs ^c	0.21^a	0.14^a	-0.06	0.01	0.15^a	0.21^a	0.21^a	0.19^a	0.25^a

Abbreviations: F1, balanced appraisals; F2, cognitive flexibility; F3, equanimity; F4, commitment to values.

^aCorrelation is significant at the .01 level (2-tailed).

^bCorrelation is significant at the .05 level (2-tailed).

^cDysfunctional beliefs and attitudes about sleep.

was used, and the results are presented in Table 4.

The results depicted in Table 4 show that the variables of “metacognitive states,” “self-efficacy of sleep,” and “dysfunctional beliefs and attitudes about sleep” together can predict 18% of the variance in quality of sleep. However, these variables together can predict 36% of the variance in the intensity of insomnia. The results of the analysis show that metacognition with an effect size of -0.19 , self-efficacy with an effect size of -0.27 , and dysfunctional beliefs and attitudes about sleep with an effect size of 0.11 can predict quality of sleep. Therefore, in order to predict quality of sleep, self-efficacy plays a more pronounced role compared with the other 2 variables. Furthermore, the results show that metacognition with an effect size of -0.35 and self-efficacy with an effect size of -0.38 can predict the intensity of insomnia. However, dysfunctional beliefs and attitudes about sleep on their own are not able to predict the intensity of insomnia.

DISCUSSION

This study was carried out in order to evaluate sleep quality among nurses and to identify the factors related to this variable. The results show that the average score of sleep quality among nurses is 6.96 ± 3.20 , indicating that the sleep quality of the nurses participating in

the study is not good. That is, 77.4% of the nurses have poor sleep quality and 7.4% of the nurses are suffering from severe insomnia. The results of a previous study show that the average level of sleep quality among nurses in Spain is 6.8 ± 3.39 .²⁴ The average level of sleep quality among nurses in China has been found to be 7.32 ± 3.24 , indicating that more than 63% of the nurses have a poor quality of sleep.²⁵ Therefore, the results of this study, similar to those of the previous studies in different countries, show that nurses have poor sleep quality.

The results of this study show a relationship between the shifts worked and sleep quality. That is, nurses who work the night shift have more sleep problems when compared with other nurses. Those who are working in the daytime have fewer sleep problems. However, there was no difference found between work shifts with regard to the intensity of an individual's insomnia. The results of the study done in Spain also indicate a significant difference between the sleep quality of nurses working night, daytime, and rotating shifts. Nurses working the night shift have more sleep problems than to other nurses.²⁴ However, the results of the 2017 study by Beebe et al²⁶ show that there is no significant difference in the quality of sleep of nurses working the night shift and the daytime shift. The presence of sleep problems in nurses working the night shift may be

Table 4. Regression Analysis for Prediction of Sleep Quality and Insomnia Severity

Dependent Variable	Model Summary	Variables Entered	B^a	β^b	P
Sleep quality	$R = 0.43$	Metacognitive	-0.11	-0.19	.001
	$R^2 = 0.18$	Self-efficacy	-0.24	-0.27	.001
	$F = 37.09$ $P = .001$	Dysfunctional beliefs and attitudes	0.03	0.11	.01
Insomnia severity	$R = 0.60$	Metacognitive	-0.19	-0.35	.001
	$R^2 = 0.36$	Self-efficacy	-0.32	-0.38	.001
	$F = 97.96$ $P = .001$	Dysfunctional beliefs and attitudes	0.004	0.01	.74

^aUnstandardized coefficient and slope of the regression line.

^bStandardized coefficient in regression analyses.

due to the fact that working the night shift interferes with the circadian rhythms.²⁷ This interference can lead to reduced quality of sleep. If the working hours result in nonstandard blocks of time for sleeping and staying awake, the result can be sleep disturbance, reduced sleep duration, and sleepiness due to the interference with the circadian rhythm.²⁸

The results of this study also show that there is a relationship between smoking and quality of sleep. That is, nurses who smoke have more sleep problems. This confirms results of a previous study that found that people who smoke have more sleep problems.²⁹ This could be because of the effects of nicotine, which causes arousal and waking up during sleep.³⁰

The results of the current study show a negative relationship between self-efficacy in sleep and quality of sleep and intensity of insomnia. That is, the lower the level of self-efficacy in sleep, the higher the number of sleep problems and the intensity of insomnia. The higher the level of self-efficacy in sleep, the lower the number of sleep problems and the intensity of insomnia. The negative relationship between self-efficacy and sleep problems has been confirmed in previous studies.^{15,16} Hence, the results of this study in this section are in line with those of the previous studies.

The results of this study also show that there is a positive relationship between dysfunctional beliefs and attitudes about sleep and quality of sleep and intensity of insomnia. That is, the lower the number of dysfunctional beliefs and attitudes about sleep, the lower the number of sleep problems and the intensity of insomnia. The higher the number of dysfunctional beliefs and attitudes about sleep, the higher the number of sleep problems and the intensity of insomnia. Previous research has confirmed the relationship between dysfunctional beliefs and attitudes about sleep and quality of sleep.^{31,32} Therefore, the results of this study are in line with those of the previous studies. In some models that explain insomnia, dysfunctional beliefs and attitudes about sleep play a core role.¹²⁻¹⁴

The results of the current study show that there is a negative relationship between metacognitive processes and quality of sleep and intensity of insomnia. This means that the lower the level of metacognitive processes, the higher the number of sleep problems and intensity of insomnia; and the higher the level of metacognitive processes, the lower the number of sleep problems and the intensity of insomnia. Previous studies show that negative metacognitive beliefs are associated with quality of sleep.^{33,34} The results of one study show that metacognitive control is associated with sleep latency, short sleep time, and lower satisfaction with sleep.³⁵ The results of another study have shown that metacognitive beliefs can predict insomnia.³⁶ Thus, the results of this study are in line with the results of previous research.

Furthermore, the results shared in this article show that the variables of “metacognitive processes,” “self-efficacy in sleep,” and “dysfunctional beliefs and attitudes about sleep” can, together, predict quality of sleep and intensity of insomnia. In a similar study, evaluating the cognitive factors related to insomnia, the results show that metacognitive beliefs, cognitive arousal, and beliefs and attitudes about sleep are related to insomnia.³⁷

In this study, metacognitive and cognitive processes were evaluated. The researchers have conceptualized 2 levels of cognitive arousal related to sleep. The first level involves all the cognitive activities related to lack of ability to initiate sleeping, which include dysfunctional beliefs and attitudes about sleep, the individual’s beliefs about the consequences of poor sleep quality, insomnia, and self-efficacy in sleep. The second level of this model involves the relationship between thoughts and sleep, which includes the emotional capacity of the symptoms of these thoughts, the interdependency of these thoughts, the methods for coping and dealing with these thoughts, and the meaning of these thoughts. In effect, these involve metacognitive processes, since at the second level of cognitive arousal, bias in concentration and perceiving thoughts related to sleep

are under focus. The continuation of this sequence and inflexibility in thoughts can create alternative beliefs, which in turn result in the development of negative emotions and second-level arousal, which will ultimately lead to reduced quality of sleep and increased insomnia. This is in fact the 2-model model of arousal in insomnia proposed by Ong et al.¹⁸ Therefore, the results of the current study represent a confirmation of this model. It can be argued that the key factor in the relationship between metacognition, sleep problems, and insomnia is arousal. In other words, the individual is put in a set of conditions where his or her arousal is increased, which leads to insomnia and reduced quality of sleep.

CONCLUSIONS

Based on the results of the study, it can be said that nurses have poor quality of sleep, and nurses working the night shift have more sleep problems when compared to others. Therefore, hospital authorities must keep this important point in mind and create plans for mitigating it. Lack of sufficient sleep can create numerous problems for nurses and patients. Furthermore, based on the results, it can be concluded that there is a relationship between self-efficacy in sleep, dysfunctional beliefs and attitudes about sleep, and metacognitive processes and quality of sleep and intensity of insomnia. These variables can

predict quality of sleep. Therefore, health care professionals must consider the role these variables play to improve quality of sleep.

Study limitations

This study was a cross-sectional study, so it is essential for future studies to evaluate the effects of independent variables on sleep disorders and quality of sleep in a longitudinal manner. On the other hand, experimental studies must be carried out to evaluate and measure the impacts of these variables. Since the current study has been carried out in Kermanshah City of Iran, caution must be exercised when generalizing its results; and these variables should be evaluated in other populations.

Relevance to clinical practice

Lack of sufficient sleep can create numerous problems for nurses and patients. Attention to the role of cognitive and metacognitive processes can help improve the sleep quality. Nurse leaders should consider the potential risks for patients when nurses are not well rested. Possible interventions could include educating nurses about sleep, including organization-sponsored classes on learning to sleep well. Interventions, after appropriate study for efficacy, could become evidence-based practices that would increase safety, quality, and satisfaction of both nurses and patients.

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