

# Night Shift Work and Sleep Wake Cycle in Nurses: an Integrative Review

REVIEW

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## Abstract

**Background:** Night shift work can lead to exhaustion and fatigue, often resulting from sleep deprivation, identified by some studies as a negative factor for health.

**Objective:** To identify the characteristics of the sleep wake cycle of the nurse who works at the night shift.

**Method:** Integrative review by searching publications at the databases SCIELO, LILACS, CINAHL and PubMed, using the keywords: sleep, shift work, nursing.

**Results:** There was selection of 11 articles; 54% of the studies were published in 2012 and 2013, which allowed observing features of the night worker in the course of 24 hours. They were developed along two axes: night worker and sleep, and night worker and vigil.

**Conclusion:** We can conclude that hospitals need to adopt preventive measures regarding the physical and mental health of workers of the night shift.

## Introduction

Nursing care to health are generally available 24 hours a day, for every day of the week. Therefore, those who work in the health system meet working hours in shifts to ensure sufficient quantity of professionals for the team and comprehensive care to the patient [1].

In this context, nurses represent the largest group of professionals working in the health system, recognized by their long working hours,

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with times of six, eight and 12 hours in the day and night periods, with a weekly day off, or 36 hours of rest in case of night shift [2].

In professionals with long hours, everyday activities can lead to exhaustion and fatigue, often resulting from sleep deprivation, especially those who work in the night shift or rotating shift, also identified by some studies as a negative factor for health, by hindering any attempt to adapt the biological clock and sleep/vigil cycle to the work routine [3].

There are several consequences of working at night for nurses' health, manifesting through changes in biological balance, worsening of diseases, low immunity, premature aging, changing eating and sleep habits, loss of attention, accumulation of errors in the development of job functions, depression and problems related to family and social life [4].

The need for sleep is a process common to all living beings and essential to maintain health, daily yield and quality of life [5]. Sleep is a physiological characteristic of humans; once established the sleep architecture of an individual, it is possible to detect and quantify the changes that may occur. Several studies on sleep-vigil cycle identify similar sleep patterns among nurses [6].

The repercussions of the sleep-wake cycle in nurses working at the night shift show order changes in physiological systems, especially when occurring sleep deprivation, causing changes in the circadian rhythm [2-3].

Considering those assumptions, this research was conducted in order to answer the following question: What are the main features of the sleep-wake cycle found in the scientific literature about the nurse who works at the night shift? The night worker in hospitals presents numerous complaints about health status, condition that can lead to sleep disturbances, with impaired wakefulness.

## Method

This is an integrative review. For its implementation, there was the development of a protocol, which adopted the following steps: definition of the research question and objective; establishment of inclusion and exclusion criteria for the articles [sample selection]; databases, descriptors used in the search crossing, descriptors, strategy for data collection of articles and critical evaluation of studies [7]

The development of the research question based on the strategy [Problem; Variables; Result]. Thus, the main question for the study was: "What are the main features of the sleep-wake cycle found in the scientific literature about the nurse who works at the night shift?"

For selecting the sample of the study, there was a survey of the texts in July 2015 in the electronic databases: Scientific Electronic Library Online (SciELO), Latin American and Caribbean Health Sciences (LILACS), Cumulative Index to Nursing and Allied Health Literature (CINAHL), National Library of Medicine and National Institutes of Health (PUBMED) and Web of Science, using the indexed descriptors in MeSH "sleep"; "shift work" or "nursing".

The inclusion criteria for selecting the found articles were: texts in the form of scientific articles available for free and in full at the selected databases, in Portuguese, English and Spanish, with no time limit. The selection of manuscripts according to the theme occurred at the reading for the eligibility criteria.

Articles that did not address the issue in a relevant way to answer the research question were excluded, as well as publications such as dissertations, theses, editorial and notes to the editor, and duplicate items, counted only once.

Two independent researchers performed the selection of the articles, based on the study protocol, analysis of titles and abstracts of the publications. At last, there was a consensus of the articles to be

read in full of those studies previously selected by the researchers.

## Results

**Table 1** presents a summary of the studies included in the review, which constituted the study corpus and represented the essence for processing the re-

**Table 1.** Summary of included studies on the characteristics of the night shift worker – Natal, RN, 2015.

ID/Data bases	Year of Publication/ Country	Title	Type of study/ Sample	References
06 SCIELO	2013 Brazil	The relationship between shift work and sleep patterns in nurses	Cross-sectional n:60	De Martino MMF, Abreu ACB, Barbosa MFS, Teixeira JEM. The relationship between shift work and sleep patterns in nurses. <i>Ciência &amp; Saúde Coletiva</i> 2013; 18(3):763-768.
08 CINAHL	2013 New Zealand	Nurses aged over 50 years and their experiences of shift work	Cross-sectional n:3,275	Clendon J, Walker L. Nurses aged over 50 years and their experiences of shift work. <i>Journal of Nursing Management</i> . 2013; 21(1):903–913.
02 CINAHL	2013 Brazil	Analysis of cognitive function and sleep of nursing staff on different shift work	Cross-sectional n:109	Oliveira B, De Martino MMF. Analysis of cognitive function and sleep of nursing staff on different shift work. <i>Rev Gaúcha Enferm</i> . 2013; 34(1):30-36.
03 CINAHL	2012 Norway	Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work	Cross-sectional n:749	Moen BE, Mageroy N, Akerstedt T, Pallesen S. Individual, situational and lifestyle factors related to shift work tolerance among nurses who are new to and experienced in night work. <i>Journal of Advanced Nursing</i> . 2012; 69(5):1136–1146.
04 CINAHL	2012 Brazil	Shift work: overall health state related to sleep in nursing workers	Cross-sectional n:136	Mendes SS, De Martino MMF. Shift work: overall health State related to Sleep in nursing workers. <i>RevEsc Enferm da USP</i> . 2012; 46(6):1741-6.
09 CINAHL	2012 Norway	Self-reported sleep and health among Norwegian hospital nurses in intensive care units	Cross-sectional n:150	Bjorvatn B, Dale S, Hogstad-Erikstein R, Fiske E, Pallesen A, Waage S. Self-reported sleep and health among Norwegian hospital nurses in intensive care units. <i>Nursing Critical Care</i> . 2012; 17(4):180-188.
11 CINAHL	2012 Brazil	Chronobiological aspects of sleep of nurses in a university hospital	Quali/quantitative n:15	Xavier KGS, Vaghetti HH. Chronobiological aspects of sleep of nurses in a university hospital. <i>Rev. bras. enferm</i> . 2012; 65(1):135-40.
06 CINAHL	2012 India	Shift work - problems and its impact on female nurses in Udaipur, Rajasthan India	Cross-sectional n:60	Rathore H, Shukla K; Sing S, Tiwari G. Shift work - problems and its impact on female nurses in Udaipur, Rajasthan India. <i>RevWork</i> . 2012; 41(1):4302-4314.
07 CINAHL	2011 Canada	Napping During Night Shift: Practices, Preferences, and Perceptions of Critical Care and Emergency Department Nurses	Quali/descriptive n:17	Wendy M. Fallis DE, McMillan, Marie PE. Napping During Night Shift: Practices, Preferences, and Perceptions of Critical Care and Emergency Department Nurses. <i>Critical Care Nurse</i> . 2011; 31(2):e1-e11.
01 LILACS	2011 Brazil	Nursing work hours: individual needs versus working conditions	Cross-sectional N:696	Silva AA, Rotenberg L, Fischer FM. Nursing work hours: individual needs versus working conditions. <i>Rev Saúde Pública</i> . 2011; 45(6):1117-26.
01 SCIELO	2010 Brazil	Stress and sleep quality of nurses working different hospital shifts	Cross-sectional N:203	Rocha MCP, De Martino MMF. Stress and sleep quality of nurses working different hospital shifts. <i>Rev Esc Enferm USP</i> . 2010; 44(2):280-6.

sults, discussion and conclusion on the theme of the features of the night worker.

Most of the studies have been published in 2012 and 2013, corresponding to six articles (54%). Among the analyzed publications, six (54%) are Brazilian studies.

As for the method adopted in the selected studies, the most used was the cross-sectional method, seen in nine (82%) articles. The analysis of the ob-

**Table 2.** Characteristics of the nurses of the night shift and the sleep wake cycle.

Characteristics	Absolute Frequency
Night Worker and the sleep	
Subjective quality of poor sleep	6 (Articles 1, 2, 3, 5, 6 and 11)
Reduced sleep time	6 (Articles 1, 2, 6, 8, 10 and 11)
Increased sleep latency	5 (Articles 1, 4, 6, 7 and 11)
Higher propensity for sleep disorders	5 (Articles 1, 4, 6, 8 and 11)
Insomnia	5 (Articles 4, 5, 6, 7 and 10)
Decreased sleep efficiency	4 (Articles 1, 2, 6 and 11)
Fragmented sleep	4 (Articles 1, 2, 3 and 8)
Use of medication to sleep	3 (Articles 1, 6 and 11)
Disturbed sleep	2 (Articles 2 and 8)
Sleep Debt	2 (Articles 3 and 7)
Sleep Deprivation	2 (Articles 9 and 10)
Night Worker and the sleep	
Fatigue	8 (Articles 3,4,6,7,8,9, 10 and 11)
Excessive daytime sleepiness	7 (Articles 1, 2, 4, 6, 7, 8 and 11)
Anxiety	3 (Articles 4, 6, 8)
Depression	3 (Articles 4, 6 and 8)
Concentration difficulty	3 (Articles 5, 8 and 9)
Greater propensity for disturbances during the day	2 (Articles 6 and 11)
Irritability	2 (Articles 8 and 9)
Decreased alertness	2 (Articles 8 and 9)
Abdominal bloating	1 (Article 5)
Indigestion	1 (Article 5)
Headaches	1 (Article 5)

jectives, results and conclusions of the 11 selected studies allowed gathering them into two categories: the night worker characteristics and the sleep, and characteristics of night worker and the vigil.

**Table 2** shows the characteristics found in the literature on sleep of the night worker, and sleep and the features found in the period of vigil.

## Discussion

Currently, the studies shows that nurses are a risky population for injuries to health, especially those who work the night shift. The night service is essential for nursing, but affects the workers' health, wearing them out, favoring the appearance of comorbidities, mental and physical symptoms that interfere directly on the quality of the work and in their social relations [8].

The results of this study highlight some features present in the nurses, described in **Table 2**, especially those referring to the mental health of those professionals.

This study showed, as the most common characteristics, the subjective quality of poor sleep, increased sleep latency, insomnia, decreased sleep efficiency, fragmented sleep, sleep debt, fatigue, excessive daytime sleepiness, anxiety and depression. Thus, one observed the use of drug therapies to control those symptoms in order to minimize the damage caused by night work [9, 10, 11].

After reading and searching the articles selected from the database, the changes found in the nurse working the night shift became evident, which can be divided into two groups for a better understanding: 1. Sleep disorders and night shift work and 2. Vigil disorders and night worker, as follows.

### Night shift work and sleep disorders

The selected articles exposed several clinical manifestations: subjective quality of poor sleep, reduced sleep time, increased sleep latency, increased propensity for sleep disorders, insomnia, decreased

sleep efficiency, fragmented sleep, use of medication to sleep, disturbed sleep, sleep debt and sleep deprivation [1, 2, 6, 7].

The subjective quality of poor sleep, reduced sleep time and increased sleep latency were the most common clinical manifestations. It is noteworthy that those findings corroborate other studies when stating that individuals who work the night shift generally have those symptoms [3, 9, 10].

The reduced sleep time of those professionals, after night work, generates another consequence, the sleep debt. The morning shift leads the nurse to wake up earlier than normal, so, not only the night worker presents sleep debt due to decreased total sleep, but also do those of the day shift.

According to authors, the nurses from night shifts can use a strategy to facilitate the adjustment of their schedules, such as the habit of napping during the day. Those data suggest that napping during the evening activities can partially recover the sleep debt, and correspond to a strategy to facilitate the adjustment to daytime hours during the time off [2, 3, 12].

An internal pacemaker, located in the Suprachiasmatic Nucleus (SCN), which functions as circadian oscillators and represents the biological clock, regulates the sleep-vigil cycle. Researches indicate that the circadian rhythm of sleep regulation favors the occurrence of sleep during the night, where melatonin secretion regulates sleep efficiency, which becomes more efficient for recovery [13, 14, 15]

### Night shift work and wake disorders

Some peculiar features of the night shift worker were observed: fatigue, excessive daytime sleepiness, anxiety, depression, concentration difficulty, greater propensity for disturbances during the day, irritability, decreased alertness, abdominal bloating, indigestion and headaches. It demonstrates that the limitations and complications are not only during their sleep, since they extend throughout the 24 hours of the day [6, 7, 12].

The nurses from night shift suffer from fatigue, excessive daytime sleepiness and anxiety, which result from sleep deprivation and a non-restful sleep at night, increasing, thereby, the irritability and the depression index in that professional class. Studies show the prevalence of depression in addition to dismay, sadness and hopelessness, commonly reported, which can create a discontinuity of care or even the loss of those professionals [16, 17, 18, 10].

In addition to the symptoms related to the mental health of that individual, there were also signs such as abdominal bloating and poor digestion. Other studies mentioned those symptoms, in which nurses also reported gastrointestinal disorders [appetite disturbance, feelings of indigestion, heartburn or burning], weight gain, irritability, insomnia, headaches, concentration difficulty, feelings of depression or unhappiness, feelings of decreased self-esteem and mood lability [4, 13, 9, 19, 20].

Nevertheless, new field studies are necessary in order to observe those variables in both the sleep as the vigil period.

Given all problems resulting from the night work performed by nursing professionals, we can mention some measures that can reduce or even encourage the adaptation of the professional to night shift work, such as rest periods sufficient to establish a healthy routine; circadian typology of individuals, since they seek to work according to their biological clock.

A research that aimed to describe the acute and chronic effects of sleep deficiency in the nursing team observed that the issue lacks attention and recommended the encouragement of a policy that promotes quantity and better quality to the sleep of those professionals [5, 21].

### Conclusion

Hospitals need to be more concerned with the physical and mental health of workers of the night shift. Those characteristics can precede symptoms of

more severe conditions in their employees, because, ultimately, those factors can negatively influence the assistance provided by the worker. Finally, other studies on the issue should be developed to expand knowledge on the subject, which can and should endorse strategies to ensure the nurse quality of working life.

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