

# Sleep disorders and main determinants among hospital staffs in a referral hospital in Iran



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## Abstract

**Introduction:** The prevalence rate of sleep disorders among hospital staff is expected to high due to shift work and its related circadian cycle disturbance. Complexity, high prevalence, and health implications related to sleep disorders are of great importance.

**Objectives:** The present study aimed to assess the prevalence and main determinants of sleep disorders among hospital staff.

**Patients and Methods:** This cross-sectional study was performed on 200 head nurses, nurses, midwives, operating room technicians, health care providers, service staffs of all departments, and physicians at Shaheed Rajaei hospital in Tonekabon city, Iran in 2015. The questionnaire which assessed the sleep disturbances was sourced from four scaling systems of Global Sleep Assessment Questionnaire (GSAQ), insomnia severity index (ISI), Pittsburgh Sleep Quality Index (PSQI), and Fatigue Severity Scale (FSS).

**Results:** According to the assessment by the study adopted questionnaire, 78% (78.6% of males and 77.8% of females) suffered from work-related sleep disorders. Regarding association between work shifts and likelihood of sleep disorders, it was shown a significantly higher rate of sleep disturbances in the staffs with morning and evening shifts (100%), morning and night shifts (100%), or evening and night shifts (100%), simultaneously ( $P < 0.001$ ). Marital status, work experience, and gender could not affect sleep quality.

**Conclusion:** Most of the hospital staff especially practical nurses and nurses suffered from sleep disturbances. Simultaneous and multi-sectional work shifts lead to higher likelihood of sleep problem among staffs.

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## Introduction

In all clinical setting, round-the-clock performance is now the main occupational schedule. In other words, shift work is a standard program in health system staff. However, in reality, it is a non-standard schedule in general because of related physical and even psychological problems such as chronic fatigues, increased cardiovascular diseases likelihood, depression and anxiety, or even sleep disorders (1-5). The appearance of such disorders depends directly on toleration, personality trait, work load, hardiness, and demographic characteristics of staff (6). In this regard, the frequency of sleep disorders among hospital staffs is expected to be high due to shifting work and its related circadian cycle disturbance (4). Sleep disorders in hospital staff are mainly characterized by sleepiness and insomnia which is attributed to work-related schedule, leading sleep-time misalignment. These symptoms may lead to physical or mental disorders or even

## Key point

In a cross-sectional study performed on 200 head nurses, nurses, midwives, operating room technicians, health care providers, service staffs of all departments, and physicians in Tonekabon city, we found that most of the hospital staff especially practical nurses and nurses suffered from sleep disturbances.

unusual medication use (7). The incidence of sleep disorders varies from about 25% to 40% among general Asian population (8). Sleep disorders in these people usually begin after night shift and continue with a feeling of tiredness, sleepiness or insomnia, reduced mental capacity and importance in doing things. Continuity of these symptoms in everyday life of a person and its unrestrictedness to the day after night shift would reduce its efficiency and ability to do work and social work (9-11). It is an important issue that many staff of hospitals and also clinicians are completely unaware of the consequences of sleep disorders due to



their work shifts and thus they do not care about this entity (12). These individuals experience significant negative health consequences and diminished quality of life as a result of shift work. Furthermore, at the social level, sleep disorder is dealing with dramatically increased accident risk and financial costs for staff.

### Objectives

Given the high prevalence of sleep disorders in health care workers, especially those working in night shifts, and the risks to the health of these employees, as well as the possibility of injury due to their reduced efficiency for patients, the present study assessed the prevalence and main determinants of sleep disorders among hospital staffs in a sample hospital in Iran.

### Patients and Methods

#### Study design

This cross-sectional study was carried out on head nurses, nurses, midwives, operating room technicians, health care providers, service staffs of all departments, and physicians at Shaheed Rajaei hospital in Tonekabon city, Iran in 2015. Clinic clerks, administrative staff and those who are suffering from sleep disorders or sleep disorders caused by neurological and medical illnesses or having history of substance use were all excluded. The study questionnaire was given to the subjects. This questionnaire including demographic information, a complex of information on sleep disturbances, factors affecting participants' sleep status and the state of shifts and work schedules. Moreover the questionnaire which assessed the sleep disturbances was sourced from three scaling systems of Global Sleep Assessment Questionnaire (GSAQ), and Pittsburgh Sleep Quality Index (PSQI). The GSAQ comprises 11 items includes questions regarding age, gender, height, weight, and employment status. The 11 items are about life activities, mood and medical issues as they relate to sleep, along with symptoms associated with insomnia, obstructive sleep apnea, restless legs syndrome/periodic limb movement, and parasomnias. The PSQI assesses sleep quality. The final questionnaire adopted from the three tools consisted of 17 items graded from 0-4 that the final score higher than 32 represented sleep disorder in staffs. The reliability of these questionnaires was confirmed in the same studies with Cronbach's alpha >0.75 (3,5,12). The questionnaires were completed by samples.

#### Ethical issues

The research followed the tenets of the Declaration of Helsinki. The Ethics Committee of Tonekabon Branch, Islamic Azad University approved this study (IR.IAU.TON.REC.1399.064). Accordingly, written informed consent was taken from all participants before any data collection.

#### Data analysis

The data were analyzed through SPSS version 23.0 for

Windows. Sleep scores were calculated using the indices including normality tests (Shapiro-Wilk) and the following tests were performed; chi-square test and Mann-Whitney U test. The logistic regression test was used to determine the predictors of sleep disorders in staff. The significance level was considered less than 0.05.

### Results

Totally, 200 subjects were included in the present assessment. Of 200 staff included, 72% were female and 28% were male. The majority of staff (47%) were nurses, 17% were physicians, and 15% were service staff. More than half of the subjects (57%) had work experience of less than 5 years. Half of the staff (51%) had circulating work shifts, while 20% had night shifts. Additionally, 56% were single and 44% were married (Table 1). According to the assessment by the study adopted questionnaire, 78% suffered from work-related sleep disorders. In total, 78.6% of male and 77.8% of female subjects suffered sleep disorders without significant difference ( $P=0.90$ ). Considering different occupational levels of staffs showed that the highest prevalence rate of sleep disorders was specified to practical nurses (100%) followed by nurses (85.1%), while the lowest rate of disorders was revealed in physicians (52.9%) with a significant difference ( $P<0.001$ ). Work experience could not be an indicator for appearing sleep disorders that the frequency of sleep

Table 1. Study sample demographics

Variables	No. (%)
<b>Gender</b>	
Male	144 (72.0)
Female	56 (28.0)
<b>Job position</b>	
Practical nurse	14 (7.0)
Nurse	94 (47.0)
Surgical room technician	12 (6.0)
Service staffs	30 (15.0)
Physician	34 (17.0)
Midwifery	8 (4.0)
Hospital keeper	8 (4.0)
<b>Work experience</b>	
Less than 5 years	114 (57.0)
5-10 years	58 (29.0)
11-20 years	16 (8.0)
More than 20 years	12 (6.0)
<b>Work shift</b>	
Morning	6 (3.0)
Evening	6 (3.0)
Night	40 (20.0)
Morning-evening	6 (3.0)
Morning-night	30 (15.0)
Evening-night	10 (5.0)
Rotatory	102 (51.0)
<b>Marital status</b>	
Married	88 (44.0)
Singles	112 (56.0)

disorders in those with experience less than 5 years, 5-10 years, 11-20 years, and more than 20 years was 75.4%, 79.3%, 87.5%, and 83.3% respectively. It is concluded; it is no significant difference between work experience and sleep disorders ( $P=0.67$ ). Regarding association between work shifts and likelihood of sleep disorders, it was shown significantly higher rate of sleep disturbances in the staffs with rotational shifts as morning-evening, morning-night, evening-night simultaneously. There was a significant difference between work shift and sleep disorders ( $P<0.001$ ) (Table 2). Additionally, 72.7% of single staff and 84.1% of married staff suffered from sleep disorders with no significant difference ( $P=0.31$ ; Table 1). The results showed that there is a significant difference between some parameters of GSAQ and PSQI. There was a significant correlation between life activities, insomnia, restless legs syndrome, obstructive sleep apnea, and parasomnias with PSQI ( $P<0.05$ ). However, there was no significant correlation between mood status with PSQI ( $P=0.59$ ; Table 3).

### Discussion

According to the present study, work shift (night shift) and having two shifts spontaneously (morning-night, evening-night) can adversely affect sleep status leading increased likelihood of sleep disorders among staff. The study by Shao

**Table 2.** Prevalence of sleep disorders based on characteristics

Item	With sleep disorders	Without sleep disorders	P value
<b>Gender</b>			0.90
Male	44 (28.3)	12 (27.3)	
Female	112 (71.7)	32 (72.7)	
<b>Job position</b>			0.004
Practical nurse	14 (9.0)	0 (0.0)	
Nurse	80 (51.3)	14 (31.8)	
Surgical room technician	8 (5.1)	4 (9.1)	
Service staffs	24 (15.5)	6 (13.7)	
Physician	18 (11.5)	16 (36.4)	
Midwifery	6 (3.8)	2 (4.5)	
Hospital keeper	6 (3.8)	2 (4.5)	
<b>Work experience</b>			0.67
<5 years	86 (55.1)	28 (63.6)	
5-10 years	46 (29.5)	12 (27.4)	
11-20 years	14 (9.0)	2 (4.5)	
> 20 years	10 (6.4)	2 (4.5)	
<b>Work shift</b>			<0.001
Morning	4 (2.6)	2 (4.5)	
Evening	4 (2.6)	2 (4.5)	
Night	36 (23.1)	4 (9.1)	
Morning-evening	6 (3.8)	0 (0.0)	
Morning-night	30 (19.2)	0 (0.0)	
Evening-night	10 (6.4)	0 (0.0)	
Rotatory	66 (42.3)	36 (81.9)	
<b>Marital status</b>			0.31
Married	92 (59.0)	20 (45.5)	
Singles	64 (41.0)	24 (54.5)	

**Table 3.** Correlation between GSAQ and PSQI

GSAQ parameters	PSQI score		
	$\beta$	r	P value
Mood	0.003	0.04	0.59
Life activities	-0.03	0.17	0.03
Insomnia	1.27	0.20	0.01
Obstructive sleep apnea	0.045	0.32	0.006
Restless legs syndrome (periodic limb movement)	0.32	0.035	0.047
Parasomnias	0.076	0.35	0.002

et al confirmed the relationship between sleep quality with shift work in nurses (8). In other words, paying attention to this issue and planning to reduce staff workload and increase work efficacy is very important. In this regard, it should be planned the work shift only as a single shift to both minimizing the work capacity and minimizing work errors. Sleep disorders have a major influence on nurses' quality of life and their health status. In fact, reducing sleep quality in hospital staff can negatively affect the load of activities in workers with rotational shift, particularly with respect to their personal health status and thus to social functioning. Nevertheless, fortunately, in most clinical settings particularly in developing countries, this issue is completely ignored (10).

The results showed; most of nurses (51.1%) suffered from work-related sleep disorders. In a study conducted by Gallup institute (13), all practical nurses and 85% of nurses had different degrees of sleep disorders. The results showed that as many as 58% of participants experience some kinds of sleep problems during the year, whereas 24% of participants have insomnia. Some experts have found that the prevalence of sleep disorders among patients in primary health care is 69% near to the sleep disorders among healthcare workers. In a study by Estryn-Behar et al (14), about 31% of nurses suffered from sleep problems, therefore when the woman's sleep is less than six hours on workdays, she had regular sleep problems on workdays, and had regular sleep problems on rest days, or if she described at least two of these situations. The only association observed with shift was a higher proportion of sleep problems among nurses working at night. Recent studies have emphasized high load of sleep disorders among hospital workers especially among professionals. In a study by Alshahrani et al (15), the Sleep Quality Index was significantly higher in shift work health care providers and they concluded that the shift work among health care professionals is associated with poor sleep quality. In Korsiak and colleagues' survey (16), all type shift workers had 20-30 minutes sleep less than just day shift workers leading to sleep disorder in night shift workers. Additionally, comparing work shift-related sleep disorders in healthcare workers in western and eastern countries showed higher rate of these problems in eastern nations indicating different work planning schedules in different

countries. In a study conducted by Ghalichi et al in Iran (17), 43.1% of nurses were bad sleepers predicted with female sex, divorced, shift-working, and advanced age factors.

Demographic properties can impact sleep status as well. The most well studied of these factors is age. Researchers suggest that older shift workers have more less sleep time compared with younger shift workers (18), and report higher levels of excessive sleepiness as a result of shift work (19). Insomnia is also correlated with age and it is obvious that increased vulnerability following aging is due to changes impacting the homeostatic and circadian sleep-wake systems. In addition age, effect of gender has also been evaluated in relation to Sleep disturbances. Although most sleep disturbances research has been conducted among males, female shift workers present slightly less sleep time, and psychological distress (20). However it is not clear whether these differences are due to gender-related differences in sleep, expected roles upon returning home, or other reasons.

In the present study, nurses have more poor quality of sleep compared to other staff. Moreover, nurses with high level of education had a much higher risk of sleep disorder. In the study by Chien et al (21), 75.8% did not have nor enough sleep. Nurses, who had low level of education, were more at risk of sleep disorder compared to nurses with a college or higher education level.

In this study, shifting in two periods of the day can effectively increase the risk for sleep deficits. In other words, number of working hours and disturbances in boarding cycle may affect the sleep quality in staff. Previous studies presented shift work as one of the major causes of poor sleep quality among nurses (22,23), which were inconsistent with our results.

In conclusion, most of the hospital staff especially practical nurses and nurses suffered from sleep disturbances. Simultaneous and multi-sectional work shifts lead to higher likelihood of sleep problem among staff. The results of other studies on overall prevalence of sleep disorders among hospital workers are contradictory due to different working schedules, employing different tools for assessing sleep quality and quantity, as well as personal and even social differences.

The present study revealed that is correlation between some parameters of GSAQ and PSQI. It is significant differences between Life activities, Insomnia, Obstructive Sleep Apnea, restless legs syndrome, and parasomnias with PSQI. These conclusions were consistent with the study by Chien et al (21).

## Conclusion

The present study showed that most of the hospital staff especially practical nurses and nurses suffered from sleep disturbances. Simultaneous and multi-sectional work shifts lead to higher likelihood of sleep problem among

staff. It is suggested to perform further research on this subject with larger sample size.

## Study limitations

During the research, we encountered some problems such as inconsistencies in implementation and time constraints.

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## Authors' contribution

FZ and ERR designed the study, observed accuracy and validity of the study. AVM collected the data. ERR supervised the project. FZ and ERR wrote the paper. All authors edited and revised the final manuscript and accepted its publication.

## Conflicts of interest

The authors declared no competing interests.

## Ethical considerations

Ethical issues including plagiarism, double publication, and redundancy have been completely observed by the authors.

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