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Evaluation of the Relationship Between Sleep Quality and Occupational Accidents in Nurses

Hemşirelerde Uyku Kalitesinin ve İş Kazalarıyla İlişkisinin Değerlendirilmesi

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Abstract

Objective: The aim of this study was to evaluate sleep quality in nurses and to investigate the relationship between poor sleep quality and occupational accidents.

Materials and Methods: This cross-sectional study was conducted with nurses (n=164) who had been working in different clinics of a university hospital for at least one year and who had not previously been diagnosed with sleep disorders and who agreed to participate in the research. In the data collection form, sociodemographic characteristics, medical history, information about sleep and working conditions, and hospital employee health and safety unit records were questioned. Pittsburgh Sleep Quality Index was used to evaluate sleep quality.

Results: It was found that 77.4% of nurses had poor sleep quality. It was determined that 66.9% of nurses with poor sleep quality and 45.9% of nurses with good sleep quality worked day and night in shifts. It was observed that 38% of the nurses who participated in the study had an occupational accident in the last year, and it was found that all occupational accidents occurred in the group with impaired sleep quality and a significant difference was found between the two groups in terms of the frequency of occupational accidents.

Conclusion: It was found that nurses had poor sleep quality. Individuals with impaired sleep quality have a high frequency of working alternating day and night shifts and continuous night shifts.

Keywords: Shift work, sleep quality, occupational accidents, nurses

Öz

Amaç: Bu çalışmada hemşirelerde uyku kalitesinin değerlendirilmesi ve kötü uyku kalitesinin iş kazalarıyla ilişkisinin araştırılması amaçlanmıştır.

Gereç ve Yöntem: Kesitsel tipte olan bu araştırma bir üniversite hastanesinin farklı kliniklerinde en az bir yıldır çalışan ve araştırmaya katılmayı kabul eden, önceden uyku bozukluğu tanısı almamış hemşireler (n=164) ile yürütülmüştür. Veri toplama formunda sosyodemografik özellikler, tıbbi geçmişleri, uyku ve çalışma koşullarına ilişkin bilgileri, hastane çalışan sağlığı ve güvenliği birimi kayıtları sorgulanmıştır. Uyku kalitesi değerlendirilebilmesi için Pittsburgh Uyku Kalitesi İndeksi kullanılmıştır.

Bulgular: Hemşirelerin uyku kalitesinin %77,4'ünün kötü olduğu saptanmıştır. Uyku kalitesi kötü olan hemşirelerin %66,9'unun, iyi olanların ise %45,9'unun gece gündüz vardiya düzeninde çalıştığı saptanmıştır. Çalışmaya katılan hemşirelerin %38'inin son bir yıl içerisinde iş kazası geçirdiği gözlenmiş olup, tüm iş kazalarının uyku kalitesi bozulmuş olan grupta gerçekleştiği bulunmuş ve iki grup arasında iş kazası sıklığı açısından anlamlı farklılık saptanmıştır.

Sonuç: Hemşirelerin uyku kalitesinin kötü olduğu saptanmıştır. Bozulmuş uyku kalitesi olan bireylerde gece-gündüz dönüşümlü ve sürekli gece vardiyasında çalışma sıklığı yüksektir.

Anahtar Kelimeler: Vardiyalı çalışma, uyku kalitesi, iş kazası, hemşireler

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Introduction

Shift work is designed to maintain continuous operations by dividing labor into consecutive shifts. It is becoming increasingly prevalent in modern society, with shift system workers comprising approximately 21% of the workforce in the European Union (EU).[1,2] In Türkiye, the prevalence of shift work was reported as 8% in a 2003 report on the working conditions of EU candidate countries.[3] More recent labor force statistics from the Turkish Statistical Institute indicate that as of 2020, 13.6% of employees worked in a shift system, with 4.7% working primarily night shifts.[4]

A 24-hour work schedule typically consists of at least three shifts. However, in healthcare settings, shift schedules are often structured into two shifts within a 24-hour period.[5] These irregular work hours disrupt the circadian rhythm, which regulates the 24-hour sleep-wake cycle by promoting sleep at night and wakefulness during the day.[6] The disruption is particularly pronounced during night shifts and early morning transitions, as these work hours coincide with the body's natural need for sleep.

Research has shown that shift work is a significant risk factor for sleep disorders among nurses, who frequently work long hours and night shifts.[7] For instance, a study by Takahashi et al.[8] on 775 nurses working in shifts and providing home care services found that shift workers had a higher prevalence of sleep disorders compared to the control group. These nurses experienced more frequent insomnia symptoms, had greater difficulty falling and staying asleep, and reported lower overall sleep quality.

Insufficient or poor-quality sleep caused by shift work is associated with cognitive impairments, including memory deficits, difficulty concentrating, and reduced decision-making ability. These impairments can negatively affect psychomotor performance, increasing the likelihood of occupational accidents and errors. Experimental research has demonstrated that impaired sleep quality significantly reduces cognitive function, thereby elevating the risk of occupational accidents.[9] Indeed, studies indicate that the risk of occupational accidents is disproportionately higher during night shifts compared to evening shifts. Longer shift duration has also been associated with a greater likelihood of accidents.[10,11]

Based on the hypothesis that shift workers experience lower sleep quality, which in turn increases the risk of occupational accidents, this study aimed to assess sleep quality in nurses working in a shift system and investigate the relationship between poor sleep quality and occupational accidents.

Materials and Methods

Study Population

This cross-sectional study was conducted among nurses working in various clinics of a university hospital. A non-probability sampling approach was employed, where participants were selected based on specific eligibility criteria. Nurses who had been employed at the institution for a minimum of one year, provided informed consent, and had no prior diagnosis of sleep disorders were eligible for inclusion (n=168). Exclusion criteria included absence from work for the past year, pregnancy, having a child under the age of 2 years, being on leave during the study, refusal to participate, and missing data.

Participants were initially screened for any previous diagnoses of sleep-related disorders. Their daytime sleepiness was assessed using the Epworth Sleepiness Scale (ESS), and additional sleep-related parameters were evaluated using the Pittsburgh Sleep Quality Index (PSQI).[12,13] Based on these assessments, no participants were found to have sleep disorders such as sleep apnea syndrome, habitual snoring, or sleep movement disorders. A total of 164 participants with complete survey data were included in the final statistical analysis.

The participants were informed about data security and assured that the collected information would not be shared with third parties. Informed verbal consent was first obtained, followed by written consent. The completion of the survey forms took approximately 15 minutes.

Variables

This study examined two dependent variables: sleep quality and the frequency of occupational accidents within the past year. The International Labour Organization defines an occupational accident as an event that results in a fatal or non-fatal injury during work-related activities or while performing tasks associated with work. This also includes accidents that occur while commuting to or from work.[1] For this study, information on occupational accidents was collected from the nurses, focusing on incidents that occurred within the past month in the hospital setting (e.g., injuries caused by sharp objects, needle sticks, falls, slips, bruises, poisoning, burns, and chemical exposure to mucous membranes).

The independent variables considered for their potential impact on the dependent variables included demographic characteristics, medication use, the presence of depression, clinical department, shift type, total years of work experience, hours worked per day, and the number of nights worked in the past month. Sleep quality (assessed using the PSQI) and the frequency of occupational accidents over the past year were also included as independent variables in the analysis (Table 1).

Data Collection Tools

Sociodemographic characteristics, medical history, and information related to sleep and work conditions were assessed using a 23-item questionnaire developed based on records from the hospital's occupational safety and health unit and the relevant literature. Sleep quality was assessed using the PSQI, and daytime sleepiness was evaluated using the ESS.

Pittsburgh Sleep Quality Index

The PSQI is a self-report measure designed to assess sleep quality over the past month. It includes parameters such as subjective sleep quality, sleep latency, sleep duration, sleep disturbances, use of sleep medication, and daytime dysfunction. The scale consists of 19 self-report questions and 5 additional questions for bed partners, but only the self-report questions

Table 1. Comparison of nurses by sleep quality						
Sleep quality		**Total (n=164)**	**Good (n=37)**	**Poor (n=127)**	**X^2**	**p**
		n	n (%)*	n (%)*		
Sex	Female	144	34 (23.6)	110 (76.3)	0.745	0.292
	Male	20	3 (15.0)	17 (85.0)		
Marital status	Single	64	16 (25.0)	48 (75.0)	0.357	0.340
	Married	100	21 (21.0)	79 (79.0)		
Parental status	No	96	21 (21.8)	75 (78.2)	0.062	0.474
	Yes	68	16 (23.5)	52 (76.5)		
Education level	Undergraduate	138	30 (21.7)	108 (78.3)	0.337	0.362
	Postgraduate	26	7 (26.9)	19 (73.1)		
Department	Internal medicine	70	16 (22.8)	54 (77.2)	0.539	0.970
	Surgical unit	18	5 (27.7)	13 (72.3)		
	Intensive care	31	7 (22.5)	24 (77.5)		
	Emergency service	17	3 (17.6)	14 (82.4)		
	Outpatient	28	6 (21.4)	22 (78.6)		
Shift type	Continuous day	43	16 (37.2)	27 (62.8)	7.334	**0.026**
	Continuous night	19	4 (21.0)	15 (79.0)		
	Rotating day/night	102	17 (16.6)	85 (83.4)		
Work duration (hours/day)	8	205	26 (12.6)	79 (87.4)	0.809	0.242
	16	59	11 (18.6)	48 (81.4)		
Comorbidities		110	26 (23.6)	84 (76.4)	0.221	0.398
Medication use		61	11 (18.0)	50 (82.0)	1.140	0.192
Depression		35	6 (17.1)	29 (82.9)	0.748	0.387
Difficulty staying awake during shifts		131	28 (21.3)	103 (78.7)	0.525	0.305
Occupational accident		63	0 (0.0)	63 (100.0)	29.803	<**0.001**
		Mean ± SD	Mean ± SD	Mean ± SD		
Age (years)		34.2±8.2	34.4±9.1	34.2±7.9		0.916
Body mass index (kg/m^2)		24.2±4.0	24.0±4.4	24.3±3.8		0.738
Total work experience (years)		12.5±9.2	12.7±9.8	12.4±9.0		0.849
Night shifts in last month (days)		5.5±4.7	4.86±5.0	5.63±4.6		0.385
Epworth Score		1.5±1.1	1.2±0.7	1.5±1.2		**0.048**

*Row percentages are given.
SD: Standard deviation

contribute to the total score. A total score of 5 or higher was interpreted as poor sleep quality.[12]

Epworth Sleepiness Scale

The ESS is used to assess daytime sleepiness levels. Respondents are asked to rate their tendency to doze off or fall asleep during various daily activities. The ESS consists of 8 questions, each rated on a scale from 0 to 3, for a total score ranging from 0 to 24. A score of 11 or higher indicates clinically significant daytime sleepiness.[13]

Ethical Approval

Ethical approval for the study was obtained from the Ege University Ethics Committee (approval number: 269, date: 07.10.2016).

Statistical Analysis

Data were analyzed using SPSS Statistics version 22.0 for Windows (IBM Corp., Armonk, NY). Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Chi-square tests

were used to examine differences between categorical variables related to sleep quality and the occurrence of accidents over the past year. Differences in continuous variables based on sleep quality and accident occurrence were analyzed using independent samples t-tests. Logistic regression analysis was employed to identify factors influencing sleep quality and the occurrence of accidents.

Results

Evaluation of Sleep Quality

This study included 164 nurses working in a shift system [144 females and 20 males, mean age 34.2±8.1 years, mean body mass index (BMI) 24.2±3.9 kg/m^2]. According to the PSQI, 77.4% of the nurses reported poor sleep quality. When comparing nurses with good versus poor sleep quality, no statistically significant differences were observed in terms of age, gender, BMI, comorbidities, medication use, marital status, parental status, or education level (p>0.05) (Table 1). Among the nurses, 42.7% worked in internal medicine clinics, followed by intensive care units (18.9%), outpatient clinics (17.1%), surgical clinics (10.9%), and emergency departments (10.4%). No significant differences in sleep quality were found across these clinical settings. A total of 62.2% of the nurses worked a rotating day/night shift schedule, 26.2% followed a continuous daytime schedule, and 11.6% worked continuous night shift. Of the nurses with poor sleep quality, 66.9% worked a rotating day/night shift schedule, compared to 45.9% of those with good sleep quality (p=0.026). No significant differences in sleep quality were found between the groups based on hours worked per day, number of night shifts worked in the past month, years of work experience, or difficulty staying awake during shifts (Table 1).

In regression analysis, working the day shift continuously was associated with 64% lower odds of poor sleep quality than working a rotating shift schedule [odds ratio (OR): 0.36, 95%, confidence interval (CI): 0.15-0.82, p=0.015] (Table 2).

Evaluation of Occupational Accidents

We determined that 38% of the participating nurses had experienced an occupational accident in the past year. Notably, 75% of these incidents involved needlestick injuries, a significant and concerning issue within the healthcare profession. Other types of work accidents included cuts from ampoules or surgical instruments (43%), falls or slips (42%), exposure to blood and bodily fluids (25%), exposure to chemical fluids (21%), and poisoning (15%).

There was a strong correlation between impaired sleep quality and occupational accidents, with all accidents occurring among nurses who reported poor sleep quality. We also observed that the frequency of medication use was higher among nurses who had not experienced an occupational accident (52.4%) compared to those with a history of occupational accident (47.6%, p=0.047) (Table 3).

The prevalence of depression was also significantly higher among nurses who had experienced an occupational accident compared to those who had not (75.8% vs. 34.2%, p<0.001). No other statistical differences were observed between the two groups in terms of demographic variables, years of work experience, clinical department, hours worked per day, or number of night shifts worked in the past month (p>0.05).

Among the factors that may influence occupational accidents, the results of multivariate regression analysis indicated that a higher PSQI score (indicating worse sleep quality) was associated with 33% higher odds of occupational accidents (OR: 1.33, 95% CI: 1.20-1.49, p<0.001). Conversely, the absence of depression was associated with 78% lower odds of an occupational accident (OR: 0.22, 95% CI: 0.08-0.56, p=0.002). Medication use was not a significant predictor of occupational accidents (Table 4).

Discussion

This study assessed the sleep quality of nurses using the PSQI and investigated its relationship with occupational accidents. We found that 77% of nurses had poor sleep quality, and the most significant factor influencing this was working a rotating day/night shift schedule. Notably, half of the nurses with poor sleep quality had experienced occupational accidents, whereas none of those with good sleep quality had a history of accidents. Furthermore, impaired sleep quality and the presence of depression were associated with an increased risk of occupational accidents.

The Relationship Between Shift Work and Sleep Quality

Disrupted sleep quality among shift-working nurses has been widely reported in observational studies. Di Muzio et al.[14] found that 54.6% of shift workers had a PSQI score above 5, whereas Zhang et al.[15] reported a 72% prevalence of poor sleep quality among nurses. In a study conducted in Türkiye, Çelik et al.[16]

Table 2. Logistic regression analysis for factors associated with poor sleep quality

	B	Standard error	Odds ratio	95% Confidence interval		p
				Lower	Upper	
Intercept	1.22	0.39	3.41			0.002
Shift type						
Continuous day	-1.01	0.41	0.36	0.15	0.82	**0.015**
Continuous night	-0.16	0.63	0.84	0.26	3.30	0.79
Rotating day/night[(ref)]	0	-	1	-	-	-
Epworth Score	0.25	0.20	1.28	0.88	1.96	0.209

[ref]: References value

Table 3. Comparison of nurses by occupational accident status						
		Total (n=164)	**Without occupational accidents (n=101)**	**With occupational accidents (n=63)**	**X^2**	**p**
		n	**n (%)***	**n (%)***		
Sex	Female	144	91 (63.1)	53 (36.9)	1.292	0.186
	Male	20	10 (50.0)	10 (50.0)		
Marital status	Single	64	43 (67.1)	21 (32.9)	1.392	0.155
	Married	100	58 (58.0)	42 (42.0)		
Parental status	No	96	54 (56.2)	42 (43.8)	2.786	0.065
	Yes	68	47 (69.1)	21 (30.9)		
Education level	Undergraduate	138	86 (62.3)	52 (37.7)	0.198	0.407
	Postgraduate	26	15 (57.6)	11 (42.4)		
Department	Internal medicine	70	41 (58.5)	29 (41.5)	6.964	0.138
	Surgical unit	18	10 (55.5)	8 (44.5)		
	Intensive care	31	25 (80.6)	6 (19.4)		
	Emergency service	17	11 (64.7)	6 (35.3)		
	Outpatient	28	14 (50.0)	14 (50.0)		
Shift type	Continuous day	43	30 (69.7)	13 (30.3)	1.655	0.437
	Continuous night	19	11 (57.8)	8 (42.2)		
	Rotating day-night	102	60 (58.8)	42 (41.2)		
Work duration (hours/day)	8	205	64 (31.2)	41 (68.8)	0.049	0.480
	16	59	37 (62.7)	22 (37.3)		
Comorbidities		110	65 (59.1)	45 (40.9)	0.879	0.222
Medication use		61	32 (52.4)	29 (47.6)	3.419	**0.047**
Depression		35	12 (34.2)	23 (75.8)	14.017	**<0.001**
Difficulty staying awake during shifts		131	79 (60.3)	52 (39.7)	0.451	0.322
		Mean ± SD	Mean ± SD	Mean ± SD		
Age (years)		34.2±8.2	34.1±8.4	34.4±7.9		0.848
Body mass index (kg/m^2)		24.2±4.0	24.1±4.0	24.4±3.9		0.624
Total work experience (years)		12.5±9.2	12.0±9.2	13.2±9.1		0.431
Night shifts in last month (days)		5.5±4.7	5.4±4.8	5.5±4.5		0.887
PSQI total score		8.6±4.2	7.0±3.9	11.0±3.5		**<0.001**
ESS total score		1.5±1.1	1.3±0.8	1.7±1.4		0.057

*Row percentages are given.
PSQI: Pittsburg Sleep Quality Index, ESS: Epworth Sleepiness Scale, SD: Standard deviation

found that 72% of intensive care nurses had a PSQI score of ≥5. Similarly, Haznedaroğlu et al.[17] determined that 59.2% of pulmonologists had poor sleep quality during the Coronavirus Disease 2019 pandemic. Our study also demonstrated a high prevalence of poor sleep quality among nurses in various branches (77%). Moreover, total PSQI scores in our study (8.57±4.22) were higher than in the general population (5.00±3.37) but comparable to those reported for nurses [median 8.30 (0-20)].[18,19]

Circadian rhythm disruption caused by shift work has been identified as a primary factor contributing to poor sleep quality.[6,8] Previous studies have shown that rotating and night shift schedules lead to sleep disturbances due to misalignment of the endogenous circadian rhythm with the work schedule.[20] This misalignment becomes more pronounced in rotating shift schedules, where both sleep and work times change frequently.[20]

Consistent with these findings, our study showed that nurses working rotating day/night shifts had the highest prevalence of poor sleep quality, followed by those on continuous night shifts.[20] In contrast, those working continuous day shifts had significantly better sleep quality. This suggests that irregular

Table 4. Logistic regression analysis for factors associated with occupational accidents						
	B	Standard error	Odds ratio	%95 Confidence interval		p
				Lower	Upper	
Intercept	-1.71	0.83	0.18	0.03	0.89	0.04
Total work experience (years)	0.01	0.03	1.01	0.95	1.08	0.58
Night shifts in last month (days)	0.01	0.04	1.04	0.92	1.11	0.69
Medication use						
No	-0.45	0.45	0.63	0.26	1.53	0.31
Yes[ref]	0	-	1	-	-	-
Depression						
No	-1.50	0.49	0.22	0.08	0.56	**0.002**
Yes[ref]	0	-	1	-	-	-
Work duration (hours/day)						
8	-0.35	0.45	0.69	0.28	1.71	0.43
16[ref]	0	-	1	1	-	-
PSQI total score	0.28	0.05	1.33	1.20	1.49	**<0.001**
ESS total score	0.037	0.031	1.037	-0.02	0.09	0.23
PSQI: Pittsburg Sleep Quality Index, ESS: Epworth Sleepiness Scale, [ref]: Reference value						

or nocturnal work schedules contribute significantly to sleep disturbances. Additionally, the group with poor sleep quality had a higher frequency of continuous night shift work, likely due to inadequate sleep during rest periods, whether on days off or following night shifts. The discrepancy in sleep patterns between workdays and rest days may further exacerbate circadian misalignment, ultimately leading to deteriorating sleep quality.

Although age is known to affect sleep duration and quality, with older individuals typically experiencing shorter and poorer Sleep,[21,22] no significant relationship between age and sleep quality was found in our study. This could be because our study population consisted primarily of younger and middle-aged individuals (ages ranging from 18 to 58 years).

The Relationship Between Shift Work and Occupational Accidents

The occupational accident rate among nurses in our study was 38.4%, higher than the rates reported in similar studies. Sonmez et al.[23] reported an occupational accident rate of 12.4% among shift-working nurses in a university hospital in Türkiye. The discrepancy between these rates could be attributed to the wider range of accidents considered in our study. Westwell et al.[24] reported a needlestick injury rate of 12% among shift-working nurses, and this variation may also be due to differences in occupational health and safety measures across countries and different definitions of occupational accidents used in the studies. In our study, half of shift-working nurses with poor sleep quality had experienced occupational accidents, while none of those with good sleep quality had a history of accidents. This suggests that impaired sleep quality significantly increases the risk of occupational accidents, likely due to decreased concentration and cognitive function, which are consistent with findings in the literature. Recent studies indicate that the type of shift schedule influences accident risk indirectly through sleep quality. Specifically, rotating shift schedules and continuous night shifts are associated with a higher risk of accidents.[25] In our study, no significant differences were observed between the groups with and without occupational accidents in terms of their work schedules, which may be due to the insufficient sample size for statistically significant results.

The Relationship Between Depression and Occupational Accidents

The prevalence of depression in shift-working nurses in our study was 21.3%, and depression was identified as a significant factor that increased the risk of occupational accidents. Previous studies support a bidirectional relationship between shift work and mental health disorders like anxiety and depression.[25-28] Frequent shifts and the changes in shift cycles have been shown to increase the risk of developing depression. Li et al.[29] found that shift-related factors such as rotating shifts increased the prevalence of depression and anxiety disorders among shift-working nurses. Additionally, another study indicated that anxiety and depression in individuals at risk of insomnia can contribute to the deterioration of sleep quality.[30]

Depression impairs decision-making abilities, which can increase the risk of occupational accidents. Weaver et al.[26] reported a 21.6% prevalence of depression among healthcare workers and demonstrated that mood disorders were associated with a 63% higher risk of adverse events such as motor vehicle accidents, exposure to infected biological material, and medical errors. Their study also indicated that the combination of sleep and mood disorders tripled this risk. High-quality studies focusing on mood disorders in shift workers could provide further evidence of the causal relationship between depression, sleep disorders, and occupational accidents.

Study Limitations

Due to the cross-sectional design of our study, we could not establish a causal relationship between shift work, impaired sleep quality, and occupational accidents. The study sample was predominantly composed of female nurses, meaning gender-related differences in the effects of shift work on sleep disorders could not be assessed. Additionally, our research was conducted among nurses at a university hospital, which may limit the generalizability of the results to other healthcare settings or populations at different care levels. Another limitation is that we did not use the STOP-Bang questionnaire, which assesses the risk of obstructive sleep apnea (OSA) based on factors such as age, neck circumference, snoring, hypertension, and daytime sleepiness. Including this questionnaire might have provided a more accurate identification of individuals at risk for OSA. Furthermore, the presence of depression was based on self-report, which has inherent limitations. Participants responded according to their own perceptions and memory, which could lead to inaccuracies in diagnosing depression, especially for those who have not sought professional help. This could result in underreporting of depression in the study.

Conclusion

This study examined the relationship between sleep quality and occupational accidents among shift-working nurses. The findings revealed that 77% of the nurses had poor sleep quality, with a higher frequency of rotating day/night shifts among those who reported impaired sleep quality. Conversely, working the day shift continuously was associated with 64% lower odds of poor sleep quality. Furthermore, both poor sleep quality and the presence of depression were identified as significant factors associated with increased risk of occupational accidents. These results underline the need for organizational and behavioral interventions to improve sleep quality among shift-working nurses and for the implementation of strategies to prevent occupational accidents. Future studies with prospective designs should be conducted to better understand the relationship between shift patterns, circadian rhythm disturbances, and sleep quality in the nursing profession.

Ethics

Ethics Committee Approval: Ethical approval for the study was obtained from the Ege University Ethics Committee (approval number: 269, date: 07.10.2016).
Informed Consent: Informed verbal consent was first obtained, followed by written consent.

Footnotes

Authorship Contributions

Concept: N.Ç., Z.N.T., H.K., M.S.T., Ö.K.B., Design: N.Ç., Z.N.T., M.S.T., Ö.K.B., Data Collection or Processing: N.Ç., H.K., Analysis or Interpretation: N.Ç., Z.N.T., M.S.T., Ö.K.B., Literature Search: N.Ç., Z.N.T., H.K., Writing: N.Ç., Z.N.T., M.S.T., Ö.K.B.
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References

1. International Labour Organization. (2004). Fact Shift on Shift Work. [Online]. Last Accessed Date: 20.03.2024. Available from: https://www.ilo.org/publications/shift-work
2. Eurofound-Wilczynska A, Cabrita, J, Parent-Thirion A. et al. 6th European working conditions survey-2017 update, Publications Office. Last Accessed Date: 2017, Available from: https://data.europa.eu/doi/10.2806/422172
3. Paoli P, Thirion AP. Working conditions in the acceding and candidate countries; european foundation for the improvement of living and working conditions. 2003 Last accessed date: 30.03.2024. Available from: https://www.eurofound.europa.eu
4. Türkiye İstatistik Kurumu (TÜİK) İş Gücü İstatistikleri (2020). Last accessed date: 10.02.2021. Available from: https://data.tuik.gov.tr/bulten/index?p=isgucu-istatistikleri-kasim-2020-37480
5. Postalar halinde işçi çalıştırılarak yürütülen işlerde çalışmalara ilişkin özel usul ve esaslar hakkında yönetmelik. (2004, 7 Nisan). Resmi Gazete (Sayı: 25426). Last accessed date: 31.03.2024 31 Mart 2024. Available from: https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=6252&MevzuatTur=7&MevzuatTertip=5
6. James SM, Honn KA, Gaddameedhi S, Van Dongen HPA. Shift work: disrupted circadian rhythms and sleep-implications for health and well-being. Curr Sleep Med Rep. 2017;3(2):104-112.
7. Rosa D, Terzoni S, Dellafiore F, Destrebecq A. Systematic review of shift work and nurses' health. Occup Med (Lond). 2019;69(4):237-243.
8. Takahashi M, Iwakiri K, Sotoyama M, et al. Work schedule differences in sleep problems of nursing home caregivers. Appl Ergon. 2008;39(5):597-604.
9. Goel N, Rao H, Durmer JS, Dinges DF. Neurocognitive consequences of sleep deprivation. Semin Neurol. 2009;29(4):320-339.
10. Dembe AE, Erickson JB, Delbos RG, Banks SM. The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. Occup Environ Med. 2005;62(9):588-597.
11. Martins I. Investigation of occupational accidents and diseases: a practical guide for labour inspectors. Geneva, Switzerland: International Labour Office; 2015. Available from: Martins I. Investigation of occupational accidents and diseases: a practical guide for labour inspectors. Geneva, Switzerland: International Labour Office; 2015.
12. Ağargün MY, Kara H, Anlar Ö. The validity and reliability of the Pittsburgh Sleep Quality Index. Turkish Journal of Psychiatry. 1996;7:107-115. Available from: https://psikiyatridizini.net/articles.aspx?journalid=13&year=1996&volume=7&number=2
13. Ağargün MY, Çilli AS, Kara H, Bilici M, Telcioğlu M, Semiz ÜB, Başoğlu C. The validity and reliability of the Epworth Sleepiness Scale. Turkish Journal of Psychiatry. 1999;10:261-267. Available from: https://search.trdizin.gov.tr/tr/yayin/detay/9025/epworth-uykululuk-olceginin-gecerligi-ve-guvenirligi
14. Di Muzio M, Diella G, Di Simone E, et al. Nurses and night shifts: poor sleep quality exacerbates psychomotor performance. Front Neurosci. 2020;14:579938.
15. Zhang L, Sun DM, Li CB, Tao MF. Influencing factors for sleep quality among shift-working nurses: a cross-sectional study in China Using 3-factor Pittsburgh Sleep Quality Index. Asian Nurs Res (Korean Soc Nurs Sci). 2016;10(4):277-282.
16. Çelik S, Taşdemir N, Kurt A, İlgezdi E, Kubalas Ö. Fatigue in intensive care nurses and related factors. Int J Occup Environ Med. 2017;8(4):199-206.

17. Haznedaroğlu Dİ, Tunçel ÖK, Hepdurgun C, Pirildar Ş, Başoğlu ÖK. COVID-19 pandemisinin göğüs hastalıkları hekimlerinin uyku kalitesine ve ruhsal durumlarına etkisi. Arch Neuropsychiatry. 2022;59:315-320.
18. Hinz A, Glaesmer H, Brähler E, et al. Sleep quality in the general population: psychometric properties of the Pittsburgh Sleep Quality Index, derived from a German community sample of 9284 people. Sleep Med. 2017;30:57-63.
19. McDowall K, Murphy E, Anderson K. The impact of shift work on sleep quality among nurses. Occup Med (Lond). 2017;67(8):621-625.
20. Chang WP, Peng YX. Influence of rotating shifts and fixed night shifts on sleep quality of nurses of different ages: a systematic literature review and meta-analysis. Chronobiol Int. 2021;38(10):1384-1396.
21. Corbo I, Forte G, Favieri F, Casagrande M. Poor sleep quality in aging: the association with mental health. Int J Environ Res Public Health. 2023;20(3):1661.
22. Nelson KL, Davis JE, Corbett CF. Sleep quality: an evolutionary concept analysis. Nurs Forum. 2022;57(1):144-151.
23. Sonmez, S, Ursavas, A, Uzaslan, E, Ediger D, Karadag M, Gozu RO, Ege E. Sleep disorders and occupational accident in shift work nurses. Turkish Thoracic Journal, 2010:11(3):105-109.
24. Westwell A, Cocco P, Van Tongeren M, Murphy E. Sleepiness and safety at work among night shift NHS nurses. Occup Med (Lond). 2021;71(9):439-445.
25. Imes CC, Barthel NJ, Chasens ER, et al. Shift work organization on nurse injuries: a scoping review. Int J Nurs Stud. 2023;138:104395.
26. Weaver MD, Vetter C, Rajaratnam SMW, et al. Sleep-disorders, depression and anxiety are associated with adverse safety outcomes in healthcare workers: a prospective cohort study. J Sleep Res. 2018;27(6):e12722.
27. Langlieb AM, DePaulo JR Jr. Etiology of depression and implications on work environment. J Occup Environ Med. 2008;50(4):391-395.
28. Hall AL, Franche RL, Koehoorn M. Examining exposure assessment in shift work research: a study on depression among nurses. Ann Work Expo Health. 2018;62(2):182-194.
29. Li Y, Wang Y, Lv X, et al. Effects of factors related to shift work on depression and anxiety in nurses. Front Public Health. 2022;10:926988.
30. Oh CM, Kim HY, Na HK, Cho KH, Chu MK. The effect of anxiety and depression on sleep quality of individuals with high risk for insomnia: a population-based study. Front Neurol. 2019;10:849.