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RESEARCH ARTICLE

Healthcare Shift Workers' Sleep Quality, Daytime Sleepiness, and Circadian Preference

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ABSTRACT

Objective: It was aimed to evaluate sleep quality, daytime sleepiness, and circadian rhythm types in healthcare workers working in shifts at different periods.

Materials and Methods: This cross-sectional study was conducted on 125 healthcare workers in a tertiary hospital between November and December 2018. Data were collected using Epworth Sleepiness Scale, Morningness-Eveningness Questionnaire, and Pittsburgh Sleep Quality Index. Participants were divided into four groups: Those who do not work in shifts (Group 1), those who work in shifts between 18:00 and 24:00 (Group 2), those who work in shifts between 18:00 and 08:00 (Group 3), and all shift workers (Group 4).

Results: When Epworth Sleepiness Scale scores were compared, it was found that Group 4 (p=0.015) and Group 2 (p=0.007) were significantly more sleepy than Group 1. When the Morningness-Eveningness Questionnaire results were compared, no significant difference was found between the groups in terms of both morningness, eveningness, and intermediate chronotypes, and MEQ scores. According to the Pittsburgh Sleep Quality Index total score, Group 2 (p=0.005), Group 3 (p=0.003), and Group 4 (p=0.001) had significantly more impaired sleep quality than Group 1.

Conclusion: Among healthcare workers, shift work is associated with poor sleep quality and excessive daytime sleepiness (EDS). When we compare the shift groups, although no significant relationship was found, Group 2 had relatively low sleep quality and EDS compared to Group 3. Although the weekly working time (h/week) is significantly less, we think that the main factor is that the weekly working periods of the Group 2 are more frequent than the Group 3.

Keywords: Circadian rhythm, health workers, shift work, sleep quality, sleepiness

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INTRODUCTION

Shift work is common in many occupations, particularly those involving essential services, and shift workers today represent between 15% and 25% of the global workforce. Shift work is the work done by someone whose normal working hours are outside the traditional 9:00–17:00 workday.[1] Shift work can include evening or night shifts, early morning shifts, and rotating shifts.[2]

Shift work affects the health of workers in many ways. Shift workers are at higher risk for unhealthy diet, metabolic syndrome, diabetes, coronary heart disease, and breast cancer than non-shift workers.[3] Working in a shift system is a possible risk factor for psychiatric disorders, especially depression, and low quality of life. Complaints continue during shift work.[4] One of the most important reasons for the occurrence of such diseases is circadian rhythm disorder and induced sleep deprivation.[5]

Sleep affects the workforce, work performance, and social life of the employee.[6] Sleep is affected by social life, chronic illness, age, gender, marital status, tobacco and alcohol use, and other daily habits outside of working hours.[7]

Shift work is a known factor that interrupts nocturnal sleep, causes insomnia, and impairs daytime functioning by making excessive daytime sleepiness (EDS) and fatigue.[8] In addition,

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a recent study also revealed that shift workers, particularly those who work the night shift, have shorter sleep durations, and poorer sleep quality.[9]

EDS is characterized as a person's sleepiness when it is not expected that they would be. Shift work impairs performance during the day by causing subjective daytime sleepiness.[9] Several studies have shown that shift work significantly increases the risk of EDS-related sleep problems. Shift workers are more prone to experience EDS, insomnia, and poor sleep quality.[10] Studies on shift work and sleep/wake patterns have found that night shifts after midnight or early morning shifts are linked to sleep/wake pattern disturbances, which lead to poor sleep quality both during and out of the shift.[10] EDS and poor sleep quality can impair a healthcare worker's performance, leading to increase medical errors.[8] According to studies, night shift nurses are more likely to experience insomnia. The sleep quality of nurses working in mixed or continuous night shifts is low.[11] According to recent studies, 70% of nurses who work shifts frequently express EDS and fatigue.[12] Shift work is linked to EDS and poor sleep quality, according to a New Zealand online survey of 3273 nurses who were 50 years of age and older.[13] Barger et al. (2005)[14] found that long-term tasks cause sleep deprivation in assistants and trainees and are associated with EDS and medical errors. In addition, in a study made by Belayachi et al. (2013),[15] the sleepiness in a group of physicians receiving emergency medicine training was evaluated using the Ephworth Sleepiness Scale (ESS), and about two-thirds of them were found to suffer from EDS.

Circadian rhythm describes a person's 24-h physiological and biological activity. The main determinant of human sleep pattern is the circadian rhythm.[16] Light, social, and physical activities are factors that affect the circadian rhythm. The fact that the external environment is light or dark is also important in the regulation of circadian rhythm. In general, circadian rhythm sleep disorders (CRSD) describe clinical conditions in which the sleep-wake rhythm, which is suitable for environmental and social conditions, is disrupted.[17] CRSD can be divided into two groups according to the underlying cause: Due to the (1) due to changes in the endogenous circadian clock (delayed sleep phase disorder, early sleep phase disorder, irregular sleep-wake rhythm disorder, free-going sleep-wake rhythm disorder) and (2) incompatibility of environmental or social life with the endogenous circadian clock (jet lag and shift work sleep phase disorder (SWSD) (shift work disorder-SWD)).[18] Most shift workers do not have SWSD. Estimated prevalence of SWSD is approximately 10% in night shift workers.[19] Circadian rhythm disorder in shift workers can occur.[18]

The previous studies have shown that rotating shift workers[3] and night shift workers[20] tend to be more evening type compared to day workers. In addition, in the study made by Togo et al.[21] (2017) on nurses, showed that those who work in rotating shifts (n=1780) are more evening type than those who work during the day (n=1252).

Shift work is carried out in a single period or in double or triple periods. We have seen that in most studies investigating the relationship between shift work and sleep, a pairwise comparison is made between shift workers and non-shift workers. In addition, in most shift sleep studies in the literature, we noticed that the working periods of the shift group were not clear and homogeneous.[21,22] There are limited studies comparing the effects of different shift types on sleep quality.[9,11]

In this study, sleep quality, daytime sleepiness, and circadian rhythm types were compared among those who work in shifts for different periods and with those who do not work in shifts for the health workers who have been working in the same week for at least 6 months.

MATERIALS and METHODS

Study Design and Sample

A cross-sectional study was conducted at a tertiary hospital between November and December 2018. Healthcare workers aged 18–60 years were included in the study. One hundred and thirty-four healthcare workers were reached. Nine of them were not included in the study because they did not comply with the current study periods, 125 of them were included in the study. The workers who had the same weekly working order in the past 6 months were included in the study.

Participants were grouped according to their working hours. Group 1 was: Those who do not work in shifts, those who work between 08:00 and 18:00 (n=50), Group 2 was: those who work in shifts between 18:00 and 24:00 (n=38), Group 3 were those who work in shifts between 18:00 and 08:00 (n=37). Group 1 non-shift workers work 5 or 6 days a week, Group 2 shift workers work 6 days a week, and Group 3 workers work 2 or 3 days a week in shifts. In addition, all shift workers were determined as Group 4 (Group 2 and Group 3).

Before starting the study, approval was obtained from the ethics committee of the medical faculty of our university and written informed consent was obtained from all participants (Ethics committee approval no: E-10840098-772.02-4601, approval date: Sep 21, 2021). The study was carried out in accordance with the Helsinki Declaration. For assessment, the participants were asked to fill the Sociodemographic and Clinical Data Form, Morningness-Eveningness Question-

naire (MEQ), ESS and Pittsburg Sleep Quality Index (PSQI). In this study, the differences in sleep levels of the four groups were assessed and circadian preferences were compared between the four groups.

Assessment Tools

Sociodemographic and clinical data form

This was a semi-structured data collection form planned by the researchers and filled by the participants. The form was used to record data on participants' age, gender, marital status, weekly working hours, chronic disease status, psychiatric disease and history, smoking, and alcohol use.

Epworth sleepiness scale (ESS)

The Turkish validity and reliability of the scale, which was first developed by Johns (1991),[23] was performed by Ağargün et al. in 1999.[24] EDS has a high morbidity in terms of life-threatening accidents, work productivity, and psychosocial functioning. Assessment of sleepiness has great importance because of both its psychosocial consequences and its high morbidity. ESS is a test that measures the level of daytime sleepiness. ESS is a four-point Likert-type self-report scale. It is scored as 0, 1, 2, 3, and a high score indicates sleepiness. This eight-item scale shows how sleepy a person is by measuring the level of falling asleep during daily activities such as watching TV, sitting and talking to someone, or stopping at traffic lights. The internal consistency of the scale was found to be high (Cronbach's alpha=0.80) for eight different conditions.[24]

MEQ

MEQ was developed by Horne and Ostberg in 1976[25] and the Turkish validity and reliability of the scale was performed in 2007 by Ağargün et al.[26] The 19-item Likert type scale classifies people by biological clock type. According to the total score, three chronotypes (circadian type) classification is made as "morningness type" between 59 and 86 scores, "intermediate type" between 42 and 58 scores, and "eveningness type" between 16 and 41 scores. It measures a person's sleeping and waking habits. While people who prefer to wake up early in the day conform to the morningness type, evening types prefer to sleep later and work more efficiently in the evening. The reliability of the scale was high for the 1st and 2nd applications (Cronbach values 0.785 and 0.812 are, respectively).

PSQI

The Turkish validity and reliability study of the scale developed by Buysse et al. (1989)[27] was performed by Ağargün et al.[28] PSQI is a 19-item self-report scale that evaluates sleep quality and disturbance in the past month. Each question scoring ranges between 0 (no difficulty) and 3 (severe difficulty). The scale is divided into seven subscales, each of which evaluates subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disorders, use of sleep medication, and loss of daytime functionality. The PSQI score ranges from 0 to 21 when its subscales are added together. A total PSQI score greater than five indicates inadequate sleep quality of the individual with 89.6% sensitivity and 86.5% specificity, and indicates severe disturbance in at least two of the above areas or moderate disturbance in three areas. The Cronbach Alpa value of the scale was reported as 0.80.[28]

Statistical Analysis

Data were analyzed using SPSS 20 (SPSS Inc., Chicago, IL, USA). It was determined with the Kolmogorov–Smirnov test that continuous variables did not show normal distribution. In addition to descriptive statistics, we performed univariate analyzes to compare groups for sleepiness level, sleep quality, morningness-eveningness-intermediate circadian types, and sociodemographic and clinical data firstly using Mann–Witney u Test, Kruskal–Walis test, and Chi-square test. $P<0.05$ was considered statistically significant.

RESULTS

Characteristics of the Participants

Ninety-eight the 125 people included in the study are women and 27 of them are men. Among all groups, the oldest is 41, the youngest is 18, and the mean age is 23.96. The weekly working hours of the participants vary between 27 and 72 h/week, and the mean is 49.69 h/week. Sociodemographic and clinical characteristics of the groups are shown in Table 1. When sociodemographic and clinical data were compared between the groups, there was no significant difference in terms of age, gender, marital status, psychiatric illness and history, drug(s) used regularly, and presence of alcohol habit. Chronic disease was significantly higher in Group 3 (n=10, 27%) than Group 2 (n=3, 7.9%) (p=0.029). In addition, while smoking habit was significantly higher in Group 2, Group 3, and Group 4 compared to Group 1, there was no significant difference between Group 2 and Group 3 in this regard. There were significant differences between all groups in terms of weekly working time (hours/week) (Group 1: 58.68 hours/week, Group 2: 38.92 h/week, Group 3: 48.59 h/week, and Group 4: 43.69 h/week; p<0.001).

Sleep Problems of Groups

When the ESS values between the groups were compared, Group 4 (8.45±4.71; p=0.015) and Group 2 (9.29±5.14; p=0.007) were found to be significantly sleepier compared to Group 1 (6.32±4.40). There was no significant difference in sleepiness between Group 1, Group 2, and Group 3 (Table 2).

Table 1. Examination of shift and non-shift healthcare workers in terms of sociodemographic data

	Group 1 (n=50)		Group 2 (n=38)		Group 3 (n=37)		Group 4 (n=75)		Group 1 versus Group 4 p	Group 1 versus Group 2 versus Group 3 p	Group 1 versus Group 2 p	Group 1 versus Group 3 p	Group 2 versus Group 3 p
	n	%	n	%	n	%	n	%					
Age													
Mean	24.68		23.66		23.30		23.48		0.311′	0.543″			
SD	4.58		2.72		2.73		2.71						
Gender													
Male	9	18	9	23.7	9	24.3	18	24.0	0.425*		0.513*	0.472*	0.948*
Female	41	82	29	76.3	28	75.7	57	76.0					
Marital Status													
Married	11	22	5	13.2	4	10.8	9	12.0	0.135*		0.287*	0.172*	1.000*
Single/divorced	39	78	33	86.8	33	89.2	66	88.0					
Weekly working period													
Mean	58.6 8		38.92		48.59		43.69		**0.000′**	**0.000″**	**0.000′**	**0.000′**	**0.000′**
SD	3.99		14.07		8.00		12.40						
Chronic disease													
None	43	86	35	92.1	27	73	62	82.7	0.618*		0.505*	0.130*	0.029*
Yes	7	14	3	7.9	10	27	13	17.3					
Psychological illness													
None	49	98	38	100	36	97.3	74	98.7	1.000*		1.000*	1.000*	0.493*
Yes	1	2	0	0	1	2.7	1	1.3					
Continuous medication													
None	44	88	35	92.1	30	81.1	65	86.7	0.827*		0.726*	0.371*	0.191*
Yes	6	12	3	7.9	7	18.9	10	13.3					
Psychiatric history													
None	44	88	37	97.4	36	97.3	73	97.3	0.059*		0.135*	0.231*	1.000*
Yes	6	12	1	2.6	1	2.7	2	2.7					
Alcohol use													
None	49	98	38	100	36	97.3	74	98.7	1.000*		1.000*	1.000*	0.493*
Yes	1	2	0	0	1	2.7	1	1.3					
Smoking													
None	43	86	24	63.2	25	67.6	49	65.3	**0.011***		**0.013***	**0.040***	0.688*
Yes	7	14	14	36.8	12	32.4	26	34.7					

′: Mann–Witney U Test; ″: Kruskal–Wallis Test; *: Chi-square test; Group 1: Non-shift worker; Group 2: 18:00–24:00 shift worker; Group 3: 18:00–08:00 shift worker; Group 4: all of shift worker. SD: Standard deviation

Table 2. Examination of shift and non-shift healthcare workers in terms of sleep parameters

	Group 1 (n=50)		Group 2 (n=38)		Group 3 (n=37)		Group 4 (n=75)		Group 1 versus Group 4 p	Group 1 versus Group 2 versus Group 3 p	Group 1 versus Group 2 p	Group 1 versus Group 3 p	Group 2 versus Group 3 p
	n	%	n	%	n	%	n	%					
ESS													
Mean	6.32		9.29		7.59		8.45		**0.015'**	**0.023"**	**0.007'**	0.161'	0.178'
SD	4.40		5.14		4.12		4.71						
MEQ													
Morning	6	12.0	3	7.9	2	5.4	5	6.7	0.579*		0.323*	–*	–*
Evening	7	14	10	26.3	2	5.4	12	16.0					
Intermediate	37	74	25	65.8	33	89.2	58	77.3					
MEQ score													
Mean	49.92		47.92		49.65		48.77		0.398'	0.679"			
SD	6.64		7.38		5.42		6.50						
PSQI-1 (subjective sleep quality													
Mean	1.24		1.55		1.54		1.55		**0.019'**	0.063"			
SD	0.77		0.72		0.73		0.72						
PSQI--2 (sleep latency)													
Mean	1.10		1.55		1.27		1.41		0.063	0.079"			
SD	0.79		1.01		0.84		0.93						
PSQI--3 (sleep duration)													
Mean	0.90		0.79		0.65		0.72		0.463'	0.456"			
SD	1.07		0.84		0.95		0.89						
PSQI--4 (habitual sleep efficiency)													
Mean	0.64		0.71		0.68		0.69		0.658'	0.906"			
SD	0.96		0.98		0.94		0.96						
PSQI--5 (sleep disorders)													
Mean	1.38		1.74		1.70		1.72		**0.003'**	**0.014";**	**0.019'**	**0.009'**	**0.812'**
SD	0.64		0.80		0.52		0.67						

Table 2. Cont.

	Group 1 (n=50) n	%	Group 2 (n=38) n	%	Group 3 (n=37) n	%	Group 4 (n=75) n	%	Group 1 versus Group 4 p	Group 1 versus Group 2 versus Group 3 p	Group 1 versus Group 2 p	Group 1 versus Group 3 p	Group 2 versus Group 3 p
PSQI--6 (use of sleeping pills)													
Mean	0.06		0.68		0.35		0.52		**0.000'**	**0.000''**	**0.000'**	**0.011'**	0.080'
SD	0.31		0.90		0.75		0.84						
PSQI--7 (loss of daytime functionality)													
Mean	0.88		1.26		1.51		1.39		**0.002'**	**0.005''**	**0.030'**	**0.002'**	0.324'
SD	0.85		0.92		0.99		0.96						
PSQI-total													
Mean	6.16		8.29		7.70		8.00		**0.001'**	**0.002''**	**0.005'**	**0.003'**	0.261'
SD	3.61		3.67		2.63		3.19						

': Mann–Witney U Test; '': Kruskal–Wallis test; *: Chi-square test; reliable analysis could not be made, Group 1: Non-shift worker; Group 2: 18:00-24:00 shift worker; Group 3: 18:00-08:00 shift worker; Group 4: all of shift worker. ESS: Ephworth Sleepiness Scale; SD: Standard deviation; MEQ: Morningness-Eveningness Questionnaire; PSQI: Pittsburg Sleep Quality Index

When the MEQ results were compared, no significant difference was found between the groups in terms of morningness, eveningness, and intermediate chronotypes, as well as MEQ values (Table 2).

According to the PSQI total score, we can say that Group 2 (8.29±3.67; p=0.005), Group 3 (7.70±2.63; p=0.003) and Group 4 (8.00±3.19; p=0.001) sleep quality was significantly more disturbed than Group 1 (6.16±3.61). There was no significant difference between Group 2 and Group 3. When the PSQI subscales and total score were compared between the groups (Table 2.), we can say that the subjective sleep quality of the Group 4 (1.55±0.72; p=0.019) was significantly worse than Group 1 (1.24±0.77) in the PSQI 1 component. No significant difference was found in other comparisons among groups. No significant difference was found between the groups in terms of sleep latency in the PSQI 2 component. There was no significant difference between the groups in terms of sleep duration and habitual sleep efficiency in PSQI 3 and 4 components, respectively. In PSQI 5 component, we can say that Group 2 (1.74±0.80; p=0.019), Group 3 (1.70±0.52; p=0.009), and Group 4 (1.72±0.67; p=0.003) sleep disorders are significantly more notable than Group 1 (1.38±0.64). There was no significant difference between Group 2 and Group 3. In the PSQI 6 component, we can say that the frequency of use of sleeping pills of Group 2 (0.68±0.90; p=0.000), Group 3 (0.35±0.75; p=0.011), and Group 4 (0.52±0.84); p=0.000) were higher than Group 1 (0.06±0.31). There was no significant difference between Group 2 and Group 3. In PSQI 7 component, we can say that loss of daytime functionality of Group 2 (1.26±0.92; p=0.030), Group 3 (1.51±0.99; p=0.002), and Group 4 (1.39±0.96; p=0.002) were significantly higher than the Group 1 (0.88±0.85). There was no significant difference between Group 2 and Group 3.

DISCUSSION

Our primary objective was to use standardized questionnaires to investigate sleep quality, daytime sleepiness, and chronotype among shift workers and non-shift workers in the health-care industry. Healthcare workers who have been working at the same weekly schedule for at least 6 months were included in our study, which was carried out in a

university hospital. We found that shift work is a major cause of sleep quality deterioration in healthcare workers, and healthcare workers working in shifts are sleepier during the daytime. However, there was no significant difference among shift workers. In addition, there was no significant difference between the groups in terms of chronotype.

ESS scores showing normal daytime sleepiness were compared in all groups. Group 4 (8.45±4.71) and Group 2 (9.29±5.14) consisting of shift workers were found to be significantly sleepier compared to Group 1 (6.32±4.40). ESS score of ≥10 represents EDS.[29] Accordingly, we cannot talk about a clinically significant sleep state in any of our groups. Our sleepiness values are consistent with the study conducted in Saudi Arabia among health professionals who work in shifts (ESS=8.5; n=351) and who do not work in shifts (ESS=7.13; n=159). This finding can be explained by making the assumption that shift workers can nap in between shifts or consume caffeine-containing beverages while working.[22] No significant difference was found between Group 1 (6.32), Group 2 (9.29), and Group 3 (7.59) in terms of sleepiness. Although the weekly working time (h/week) of Group 2 (38.92±14.07) was significantly less than that of Group 3 (48.59±8.00), the sleepiness values were relatively higher, and this may depend on the working schedule, which is 5–6 days a week for Group 2 and 2–3 days for Group 3. Therefore, we think that the frequency of the working periods rather than the working time may increase sleepiness.

Like all living things, humans regulate their life functions according to the movements of the sun, and this is provided by the circadian rhythm. Circadian rhythm controls sleep-wake, body temperature, eating habits, metabolism, and hormonal system.[30] Night work alters the timing of light exposure and causes disruption of circadian rhythm in the type of "circadian rhythm disturbance due to a mismatch of environmental or social life according to the endogenous circadian clock".[18] Studies conducted in populations of healthcare workers and various other industries have shown that rotating or night shift workers are more of the evening type than day workers.[3,20,21] However, contrary to what we expected, we did not find any significant difference between non-shift workers and shift workers, nor among the groups of shift workers in terms of morning-evening or chronotype. This situation may have been affected by the small number of our sample. Age is among the factors affecting the ability to cope with shift work.[31] Our sample consisted of a young staff population aged between 18 and 41, with a mean of 23–25 for all groups. On the contrary, the mean age was higher in the studies that we mentioned above (34–45). We think that the coping skills provided by the young age may have disrupted the significance between the groups in terms of morningness-eveningness or chronotype.

Shift work is a significant factor that contributes to sleep issues and impairs daytime performance. All groups in our study had high PSQI scores (≥5); however, we can say that the sleep quality in Group 2, Group 3, and Group 4 was significantly more disordered than Group 1. These results were similar to the study conducted by Alshahrani et al.[22] (2017) in shift and non-shift health-care professionals. Although the PSQI score was higher in Group 2 (8.29±3.67) than Group 3 (7.70±2.63), there was no significant difference between the shift groups. When we look at the PSQI components, the values of subjective sleep quality, sleep disorders, use of sleeping pills, and loss of daytime functionality were significantly higher in general shift workers (Group 4) than in non-shift workers (Group 1). In the study of Alshahrani et al. (2017),[22] subjective sleep quality, sleep latency and sleep disturbance values were significantly higher in the shift group. In this regard, our findings were partially compatible with the study of Alshahrani et al. (2017).[22] In addition, Group 2 and Group 3 working in shifts had significantly worse sleep quality in the components of sleep disorders, use of sleeping pills, and loss of daytime functionality compared to Group 1 not working in shifts. Almost all the values of Group 2 were higher than Group 3 in terms of PSQI components and scores among the shift groups, but there was no significant relationship; this relative difference may depend on the working schedule, which is 5–6 days a week for Group 2 and 2–3 days for Group 3. In terms of weekly working hours (h/week), Group 1 (58.68±3.99) was working significantly at the most and followed by Group 3 (48.59±8.00) and Group 2 (38.92±14.07), respectively; therefore, we think that the frequency of the working periods, rather than the duration of the working, deteriorates the sleep quality. In general, these findings explain why shift workers have higher PSQI and show that shift workers have poorer sleep quality. In this group, high PSQI scores might be a sign of sleep disorders.

It might be expected that the PSQI score for the group that does not work in shifts should be normal (<5); however, the mean PSQI score for those not working in shifts is 6.16. This finding may be due to sleep disorders in those not working in shifts.[22]

Another argument is that this group may already have sleep issues as a result of prior exposure to shift work.[32] However, the working of the workers according to the current work schedule for at least 6 months seems to reduce this possibility.

These findings might suggest that sleep disorders are widespread among healthcare workers. Studies investigating sleep in healthcare workers find that sleep disorders are common but not noticed in healthcare workers,[22] and our findings confirm this. The usage of sleeping drugs, short sleep duration, and extended sleep latency are not the only things that contribute to poor sleep quality in healthcare workers. Conflict between sleep, work, and social duties can also contribute to this syndrome, as does circadian misalignment.

Original Aspects of Our Study

The first one is that we did not specify explicitly schedule of non-shift/shift work by time (hr), course (at least 6 months) and frequency (weekly). Second, while the literature studies generally consist of mixed groups with different work schedules whose shift groups are not separated according to working periods, the shift groups are evaluated separately in our study.[21,22] We think that these are important factors that show the effects of shift work on sleep.

Study Limitations

The first limitation is that in terms of sleep quality, daytime performance, and circadian type (crona type), our study may not represent all health-care professionals and that no discrimination has been made according to sub-professional groups. The second limitation is that self-report scales were used in the measurements instead of the scales applied by the expert.

CONCLUSION

Shift work is associated with poor sleep quality and EDS in healthcare workers. When we compare the shift groups, a significant relation could not be found but Group 2 has relatively low sleep quality and EDS compared to Group 3. Although the weekly working time (h/week) is significantly less, we think that the main factor is that the weekly working period of Group 2 is more frequent than Group 3. Healthcare workers who work in shifts have higher PSQI scores than those who do not work in shifts and this indicates that the sleep disorders may be more common in this population. Healthcare workers need more training on getting enough sleep and maintaining healthy sleep habits. Healthcare workers should consult a sleep specialist when they experience sleep disorders and/or EDS that interfere with their daily work. In addition, when arranging shift schedules in hospital environments, it should be kept in mind that the frequency of shifts may be one of the main factors affecting the sleep. These findings suggest that sleep disorders in this population should be studied further.

Disclosures

Ethics Committee Approval: The study was approved by the İstanbul Medipol University Non-interventional Clinical Research Ethics Committee (No: E-10840098-772.02-4601, Date: 21/09/2021).

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Externally peer reviewed.

Authorship Contributions: Concept: A.K., S.K., M.Y.A.; Design: A.K., S.K., M.Y.A.; Supervision: A.K., S.K., M.Y.A.; Materials: A.K., S.K.; Data Collection or Processing: A.K., S.K.; Analysis or Interpretation: A.K., M.Y.A.; Literature Search: A.K., S.K., M.Y.A.; Writing: A.K., S.K., M.Y.A.; Critical review: A.K., S.K., M.Y.A.

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