



THE RELATIONSHIP BETWEEN INSOMNIA-FATIGUE LEVEL, AND MEDITERRANEAN DIET COMPLIANCE OF HEALTHCARE PROFESSIONALS: A PILOT STUDY IN A TERTIARY HOSPITAL EXAMPLE DURING THE COVID-19 PANDEMIC PROCESS

SAĞLIK ÇALIŞANLARININ UYKUSUZLUK-YORGUNLUK DÜZEYLERİ VE AKDENİZ DİYETİNE UYUMLARI ARASINDAKİ İLİŞKİ: COVID-19 PANDEMİ SÜRECİNDE ÜÇÜNCÜ BASAMAK BİR HASTANEDE YAPILAN PİLOT ÇALIŞMA

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Abstract

Aim: This study was aimed to determine the levels of insomnia-fatigue and compliance with Mediterranean diet of healthcare professionals and to examine relationships among them.

Material: 132 healthcare professionals working in a tertiary public hospital participated in this cross-sectional study. An online survey form that included general characteristics, levels of insomnia (Insomnia Severity Index/ISI, score range 0-28), fatigue (Chalder Fatigue Scale/CFS, score range 0-33) and compliance with Mediterranean diet (Mediterranean Diet Adherence Screener/MEDAS, score range 0-14) of participants were used. The relationships between the obtained scores were tested using Simple and Multiple Linear Regression Analyses.

Results: 93 women (70.5%) and 39 men (29.5%) with a mean age of 30.8±8.3 years, 80.3% undergraduate degrees, 62.1% nurses/midwives' healthcare professionals were included in the study. Fatigue and compliance of Mediterranean diet scale scores were found to be higher in women than men (CFS mean±standard deviation 18.2±6.8 vs 11.2±6.7, p<0.001, and MEDAS median (interquartile range) 6.0 (3) vs 6.0 (2), p=0.036). Regardless of age, sex, shift working, and working in any service related to COVID-19 (Model 4), no correlation was found between the score of compliance to Mediterranean diet and insomnia-fatigue scores (for MEDAS-ISI relationship $\beta_1=-0.066$, Beta=-0.144, 95% CI=(-0.145)-(0.012), p=0.096, and for MEDAS-CFS relationship $\beta_1=-0.039$, Beta=-0.134, 95% CI=(-0.094)-(0.017), p=0.169).

Conclusion: Further research on this subject is needed because it is thought that physical and psychological such as anxiety, fatigue, burnout, and insomnia might affect their nutrition status negatively.

Key Words: COVID-19, Job stress, Anxiety, Sleep, Mediterranean diet

Özet

Amaç: Bu çalışmanın amacı, sağlık çalışanlarının uykusuzluk-yorgunluk düzeylerini ve Akdeniz Diyeti'ne uyumlarının belirlenmesi ve bunlar arasındaki ilişkinin incelenmesidir.

Gereç ve Yöntem: Bu kesitsel çalışmaya, üçüncü basamak bir devlet hastanesinde çalışan 132 sağlık çalışanı katılmıştır. Katılımcıların genel özellikleri, uykusuzluk (Uykusuzluk Şiddeti İndeksi/UŞİ, puan aralığı 0-28), yorgunluk (Chalder Yorgunluk Ölçeği/CYÖ, puan aralığı 0-33) düzeyleri ve Akdeniz diyetine uyum (Akdeniz Diyeti Bağlılık Ölçeği/MEDAS, puan aralığı 0-14) durumlarını içeren bir çevrim içi anket formu kullanılmıştır. Elde edilen skorlar arasındaki ilişki Basit ve Çoklu Doğrusal Regresyon Analizleri ile test edilmiştir.

Bulgular: Çalışmaya yaş ortalaması 30.8±8.3 yıl olan, %80.3'ü lisans mezunu, %62.1'i hemşire/ebe 93 kadın (%70.5) ve 39 erkek (%29.5) sağlık çalışanı katılmıştır. Yorgunluk ve Akdeniz diyetine uyum skorları kadınlarda erkeklerden daha yüksektir (CYÖ için ortalama±standart sapma 18.2±6.8 ile 11.2±6.7, p<0.001, ve MEDAS için ortanca (çeyrekler arası aralık) 6.0 (3) ile 6.0 (2), p=0.036). Yaş, cinsiyet, vardiyalı çalışma ve COVID-19 ile ilgili serviste görev alma durumundan bağımsız olarak (Model 4), Akdeniz diyetine uyum ile uykusuzluk-yorgunluk skorları arasında ilişki bulunmamıştır (MEDAS-ISI ilişkisi için $\beta_1=-0.066$, Beta=-0.144, %95 GA=(-0.145)-(0.012), p=0.096, and MEDAS-CFS ilişkisi için $\beta_1=-0.039$, Beta=-0.134, %95 GA=(-0.094)-(0.017), p=0.169).

Sonuç: Anksiyete, yorgunluk, tükenmişlik, uykusuzluk gibi fiziksel ve ruhsal etkilerin beslenme durumunu etkileyebileceği düşünüldüğünden bu konuda daha fazla çalışma yapılmasına ihtiyaç vardır.

Anahtar Kelimeler: COVID-19, İş Stresi, Anksiyete, Uyku, Akdeniz diyeti

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INTRODUCTION

Sleep loss/impairments and some mental problems such as anxiety, depression and fatigue are common among healthcare professionals (1-3). Long continuous duty hours, reduced opportunities for sleep, and shift work are major factors contributing to impairments in physical, cognitive, and emotional functioning (3). Sleep has a critical role in promoting health and sleep impairment can cause major medical disease including depression (4). In fact, insomnia, which is the presence of difficulty with sleep, increases the risk of developing anxiety, depression, and fatigue because sleep is important for good health and well-being (2). In addition, shift work and night shift load of healthcare professionals cause sleep-related problems and therefore contributes to the emergence of mental problems (5, 6).

During the COVID-19 pandemic, the situation was no different, much worse. A high prevalence of mental disorders has been observed, especially among healthcare teams working closer to infected patients, it was found that anxiety and depression scores are significantly higher (7). A systematic review and a meta-analyze revealed that the prevalence of mental health disorders was higher among healthcare workers caring for COVID-19 infected patients and the prevalence of depression, anxiety, stress, and insomnia was higher than before the pandemic (8, 9). Additionally, a study conducted in China showed that medical health workers had a higher prevalence of insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms compared with nonmedical health workers during the pandemic (10). In a study, it was revealed that nursing staff experienced poor sleep, fatigue, and multiple psychological problems during the COVID-19 pandemic, and they worked 40 hours/week, skipped 30-minute breaks (11). These data suggest that especially working in a department related to COVID-19 means that the time spent on basic needs such as sleeping, eating is much shorter.

In the results of the studies, it is reported that the lifestyles and nutritional habits of individuals have changed in the quarantines implemented due to the pandemic (12, 13). However, in this process, healthcare professionals stay away from family and home environments. For this reason, the effects of the pandemic on healthcare professionals might be different from other people, depending on the intense working hours, which is also mostly in shifts. In addition, levels of insomnia and fatigue can be also adversely affected by the situation (14, 15). Studies are showing that the nutritional habits of healthcare workers have changed during the COVID-19 pandemic (16, 17). It has been revealed that the frequency of main and snack meals decreased among healthcare workers, and although they were aware of the importance of adequate nutrition, they had a balanced diet (16). Therefore, it is seen that the nutritional characteristics of healthcare workers are deteriorating during this period. It is reported that during the COVID-19 pandemic, poor diet quality is prevalent among doctors and nurses (18).

Studies revealing the relationship between nutritional status and insomnia-fatigue levels of healthcare workers during the pandemic period have been limited. In a study conducted with healthcare professionals in Türkiye, it was reported that perceived stress and emotional eating were associated with changes in eating/dietary habits during the pandemic period (17). Less physical activity and an unhealthy diet were associated with increased depression in a study of healthcare workers in China. On the other hand, the same study also revealed that participants who had changes in physical activity, sleeping, and diet had different levels of anxiety (19).

As with all individuals, the nutritional status of healthcare professionals is very important. Especially during the COVID-19 pandemic, while they deal intensively with other individuals who are sick, it is a matter of curiosity how their nutritional status. Along with doctors, nurses, pharmacists, dietitians,

health technicians, and other allied health professionals, they are among the occupations at high risk in this pandemic (20). It is thought that negative conditions that have been going on for a long time adversely affect the nutritional status of healthcare professionals. Considering the shift working patterns, the situation is likely to be serious and the primary hypothesis of this study was that a higher level of adherence to the Mediterranean diet may be associated with lower insomnia and fatigue scores in healthcare professionals. In this study, it was aimed to evaluate the relationships between compliance to the Mediterranean diet and the levels of insomnia and fatigue of healthcare professionals working in a state hospital and compliance with the Mediterranean diet was assessed to gain insight into the nutritional status of healthcare professionals. This is because The Mediterranean diet is a nutritional style that has been accepted as the Intangible Cultural Heritage of Humanity by UNESCO since 2013, has positive effects on health and preventive effects against chronic diseases, and is characterized by the consumption of fish and seafood, olive oil, low-fat dairy products, whole grains, legumes, fresh fruits and vegetables, and red grape products (21).

MATERIAL- METHODS

Study Type

This cross-sectional and pilot study was carried out in a tertiary public hospital in Ankara, Türkiye.

Sampling

This study was conducted through an online survey with healthcare professionals from May to July 2021. The maximum number of samples that could be reached was reached in the time allocated for data collection of this study (2 months). The reason for restricting the time range of the study was that health professionals had many rush hours during the COVID-19 pandemic. The research sample consisted of all healthcare professionals (doctors, dietitians, psychologists, nurses, midwives, health technicians, and health

technicians) between the ages of 19-52 working in a tertiary state hospital during the COVID-19 process, with or without shifts. Among the criteria for inclusion in the study; being a volunteer, not having a special health condition (such as illness, continuous drug use, pregnancy, lactation), having a device such as a computer, tablet, or phone, having internet access, having enough time to fill out the survey form. Power analysis calculation on the Free Statistics Calculators website (<https://www.danielsoper.com/statcalc/default.aspx>) was made based on the Independent t-test in the study with 0.5 observed effect size (Cohen's d), a 0.05 probability level, and 132 sample size. Observed power (two-tailed hypothesis) was 0.81, and this result indicates sufficient power and a low risk of Type II error.

Data Collection Tools

Insomnia Severity Index (ISI): It is a measurement tool with high validity and reliability developed to evaluate the severity of insomnia. It consists of seven items and each item is scored between 0-4. The scores that can be obtained from the index range from 0 to 28. Index items measures these situations respectively i) difficulties in the transition to sleep, ii) difficulties in maintaining sleep, iii) waking up very early, iv) satisfaction from sleep pattern, v) impairments in daily functioning, vi) awareness of sleep-related disturbances, and vii) stress caused by sleep problems. In addition to being a self-report tool, the index is a tool that can be used by the clinician or another person (for example, a spouse) in evaluation (22).

Chalder Fatigue Scale (CFS): The scale was developed in 1993 by Trudie Chalder et al. to assess the severity of fatigue perceived by individuals over the past month. The validity and reliability of the scale were first demonstrated in patients attending primary healthcare centers (23). This scale is an easy, fast, and useful scale that evaluates the fatigue experienced by the individual during the last month through self-report. It consists of 11 items in total. Individuals are asked to answer

the items on a four-point Likert scale ("less than usual", "as usual", "more than ever", "more than ever"). As a result of the scoring made between 0-3 for each item, the total score varies between 0-33. High scores indicate greater fatigue severity. The Turkish version of the CFS was a reliable and valid instrument for assessing perceived fatigue, as demonstrated in Adın's study (2019), with a Cronbach alpha value of 0.897 (24).

Mediterranean Diet Adherence Screener (MEDAS): The 14-item Mediterranean Diet Adherence Screener (MEDAS) questionnaire was developed by the PREDIMED consortium (25). MEDAS has subsequently proven to be a valid and practical tool for rapidly determining adherence to the Mediterranean diet (26). This scale contains 14 items related to the basic type of oil used by individuals in meals, daily consumption of olive oil, daily portions of fruit, and vegetable, daily consumption of margarine-butter and red meat, weekly consumption of wine, legumes, fish-seafood, nuts, cakes, tomato sauce with olive oil. After items are given 1 or 0 points for each item according to the amount of consumption, the total score is calculated. The cutoffs ≤ 5 indicate low, 6–9 moderate, and ≥ 10 high adherence. In Özkan Pehlivanoglu's study, the reliability of the Turkish version was shown with a Cronbach's alpha coefficient of 0.829 (27).

Data Collection

The online survey form used in the study was created after a literature review on the subject. This survey form included questions about the general characteristics, working hours, and shift patterns of the participants. The form had Insomnia Severity Index (ISI), Chalder Fatigue Scale (CFS), and Mediterranean Diet Adherence Screener (MEDAS) index and scales. The data were collected by the "online survey technique" via the online link provided by the researchers.

Statistical Analysis

The data was tested in the IBM SPSS Statistics 15.0 package program. Mean ($\bar{X}$),

standard deviation (SD), lower and upper values, frequencies were calculated. After testing the normality of the data, the statistical differences between the mean values in normally distributed data and the median values in non-normally distributed data were examined. The independent variables of this research are sex, age, shift working, and working in any COVID-19 department. The dependent variables are scores of Insomnia Severity Index (ISI), Chalder Fatigue Scale (CFS), and Mediterranean Diet Adherence Screener (MEDAS). Independent t-test and Mann-Whitney U test were used to compare the values of two independent groups. One Way ANOVA test and the Kruskal Wallis test were used to compare the values between more than two independent groups. Simple and Multiple Linear Regression analyses were used to determine the relationships between MEDAS and ISI, CFS scores. The $p < 0.05$ value was taken as the significance level.

Ethical Approval

First, after applying to the Ministry of Health Scientific Research Platform and getting approval, permission was obtained from the Health Sciences University, Gülhane Health Application and Research Center. With these permissions, approval was obtained from the Ethics Committee of the Rectorate of Ankara University (numbered 68 dated 26.4.2021). The study was conducted to the principles outlined in the Declaration of Helsinki. Participants were included in the study after they were informed, and their consent was obtained through an online questionnaire.

RESULT

A total of 132 healthcare professionals, 93 women (70.5%) and 39 men (29.5%), with a mean age of 30.8 ± 8.3 years, participated in the study. 62.1% ($n=82$) nurse-midwife, 16.6% ($n=22$) health technician, 7.6% ($n=10$) dietitian and psychologist, 6.1% ($n=8$) were physicians, 7.6% ($n=10$) were other health professionals. 15.1% ($n=20$), 80.3% ($n=106$), and 4.5% ($n=6$) of them were at high school degree, at

undergraduate degree, and at postgraduate degree respectively. Working hours varied between 08.00AM-04.00PM, 04.00PM-08.00AM, and 08.00AM-08.00PM. According to their working patterns, 41.7% (n=55), 29.5% (n=39), and 28.8% (n=38) were working in irregular shifts, only daylight hours,

and regular shifts respectively. 23 (17.4%) of participants cared for COVID-19 infected patients. The mean MEDAS score of the participants was 6.3 ± 2.2 , and the majority showed moderate adherence to the Mediterranean diet (n=78, 59.1%) (Table 1).

Table 1. Sociodemographic and work-related characteristics of healthcare professionals (n=132)

Characteristics	Groups	Number	Percentage (%)
Sex	Women	93	70.5
	Men	39	29.5
Education	High school	20	15.2
	Undergraduate	106	80.3
	Postgraduate	6	4.5
Occupation	Nurse-midwife	82	62.1
	Health technician	22	16.6
	Physician	8	6.1
	Dietitian	5	3.8
	Psychologist	5	3.8
	Others*	10	7.6
Shift working	Regular shifts	38	28.8
	Only daylight hours	39	29.5
	Irregular shifts	55	41.7
Working in any COVID-19 department	Yes	23	17.4
	No	109	82.6
Age (years)	≤30	83	62.9
	>30	49	37.1
Mean±SD (min-max)	30.8±8.3 (17-52)		
MEDAS categories and total score	≤5 (Low)	45	34.1
	6-9 (Moderate)	78	59.1
	≥10 (High)	9	6.8
Mean±SD (min-max)	6.3±2.2 (1-14)		

*Physiotherapist, audiologist, social worker, speech and language therapist, patient care staff

MEDAS: Mediterranean Diet Adherence Screener

The ISI, CFS, and MEDAS scores were 10.1 ± 4.7 (0-23), 16.1 ± 7.5 (0-33), and 6.3 ± 2.2 (1-14), respectively. It was found that the mean CFS scores of women (18.2 ± 6.8) were higher than men (11.2 ± 6.7) ($t=-5.430$, $p<0.001$). Participants aged >30 years had a higher mean CFS score (18.4 ± 6.7) than those aged ≤30

years (14.8 ± 7.6) ($t=-2.732$, $p=0.007$). The median MEDAS score of women [6.0 (3)] was detected to be higher than that of men [6.0 (2)] ($U=1398.000$, $p=0.036$). ISI, CFS, MEDAS scores did not differ according to working in shifts and working in any department related to COVID-19 ($p>0.05$) (Table 2).

Table 2. Insomnia and fatigue scores of health professionals and their compliance with the Mediterranean diet

Features	ISI $\bar{X} \pm SD$ (lower-upper)	CFS $\bar{X} \pm SD$ (lower-upper)	MEDAS Median (IQR)/ $\bar{X} \pm SD$ (lower-upper)*
Sex			
Women	10.5 $\pm$ 4.9 (0-23)	18.2 $\pm$ 6.8 (0-32)	6.0 (3) [6.6 $\pm$ 2.3 (1-14)]
Men	9.2 $\pm$ 3.4 (2-19)	11.2 $\pm$ 6.7 (0-33)	6.0 (2) [5.6 $\pm$ 1.7 (1-8)]
Test results	t=-1.562 p=0.121	t=-5.430 p<0.001	U=1398.000 p=0.036
Age (years)			
≤ 30 (n=83)	10.0 $\pm$ 4.9 (0-23)	14.8 $\pm$ 7.6 (0-31)	6.0 (2) [6.2 $\pm$ 2.3 (1-14)]
>30 (n=49)	10.4 $\pm$ 4.4 (2-18)	18.4 $\pm$ 6.7 (2-33)	6.0 (3) [6.5 $\pm$ 1.9 (2-11)]
Test results	t=-0.488 p=0.629	t=-2.732 p=0.007	U=1860.500 p=0.409
Shift working			
Regular shifts	9.7 $\pm$ 5.0 (0-23)	14.2 $\pm$ 8.9 (0-33)	6.5 (3) [6.3 $\pm$ 2.1 (1-9)]
Only daylight hours	11.0 $\pm$ 4.4 (2-22)	17.7 $\pm$ 6.2 (4-31)	6.0 (2) [6.0 $\pm$ 1.9 (1-14)]
Irregular shifts	9.4 $\pm$ 4.6 (0-18)	15.7 $\pm$ 7.2 (0-32)	6.0 (3) [6.7 $\pm$ 2.5 (2-12)]
Test results	F=1.548 p=0.217	F=2.546 p=0.082	H=1.912 p=0.385
Working in any COVID-19 department			
Yes (n=23)	10.0 $\pm$ 4.0 (3-17)	17.4 $\pm$ 7.2 (3-33)	6.0 (2) [6.0 $\pm$ 2.1 (2-11)]
No (n=109)	10.1 $\pm$ 4.8 (0-23)	15.9 $\pm$ 7.5 (0-32)	6.0 (3) [6.4 $\pm$ 2.2 (1-14)]
Test results	t=-0.096 p=0.924	t=0.872 p=0.385	U=1105.000 p=0.366

ISI: Insomnia Severity Index, CFS: Chalder Fatigue Scale, MEDAS: Mediterranean Diet Adherence Screener

$\bar{X}$: mean, SD: standard deviation, IQR: interquartile range

Independent t-test, Mann-Whitney U test, One Way ANOVA test, and the Kruskal Wallis test were used.

*The MEDAS scores did not show a normal distribution and median (IQR) values were compared.

Independent t, Mann-Whitney U, One Way ANOVA and Kruskal Wallis tests were used. While one-point changes in ISI and CFS scores do not statistically significantly decrease the

MEDAS score, this result did not change when adjustments were made for age, sex, working in shifts, and working any departments related to COVID-19 ($p > 0.05$) (Table 3).

Table 3. The Relationship between insomnia and fatigue scores and MEDAS score

	MEDAS					
	$\beta 1$	Beta	95% CI	R ² -adjusted R ²	t	p
ISI						
Model 1	-0.051	-0.110	(-0.130)-(-0.029)	0.012-0.004	-1.267	0.207
Model 2	-0.066	-0.144	(-0.145)-(-0.012)	0.021-0.014	-1.673	0.097
Model 3	-0.066	-0.144	(-0.145)-(-0.013)	0.021-0.014	-1.662	0.099
Model 4	-0.066	-0.144	(-0.145)-(-0.012)	0.021-0.014	-1.677	0.096
CFS						
Model 1	-0.001	-0.004	(-0.051)-(-0.049)	1.4x10 ⁻⁵ /0.008	-0.042	0.967
Model 2	-0.004	-0.140	(-0.096)-(-0.015)	0.016/0.008	-1.454	0.148
Model 3	-0.041	-0.141	(-0.096)-(-0.015)	0.016/0.008	-1.445	0.151
Model 4	-0.039	-0.134	(-0.094)-(-0.017)	0.015/0.007	-1.382	0.169

ISI: Insomnia Severity Index, CFS: Chalder Fatigue Scale, MEDAS: Mediterranean Diet Adherence Screener, CI: Confidence Intervals

Model 1: unadjusted; Model 2: adjusted for age and sex; Model 3: Model 2 + adjusted for the status of shift working; Model 4: Model 2 + adjusted for the status of working in any unit related to COVID-19

Simple and Multiple Linear Regression Analyses were used.

DISCUSSION

One of the occupational groups most affected by the COVID-19 epidemic is healthcare professionals working on the front line. The fact that working hours were different during the pandemic changed the usual living conditions. There are studies reporting that the mental health of healthcare workers weakened, and their nutritional status deteriorated during this period (8-10, 16, 17). However, evidence addressing the relationship between the changing nutritional status and mental health of healthcare workers during the pandemic is limited. In this study, the relationship between compliance with the Mediterranean diet and fatigue-insomnia levels of healthcare professionals working in a hospital during the COVID-19 pandemic was examined. Most participants were women and nurse-midwives, and two in three worked shifts regularly or irregularly. Most majority were below 30 years and approximately one in five worked in a COVID-19 department. Participants' mean MEDAS score was in the moderate category and the mean MEDAS was higher in women than men. There was no relationship between ISI and CFS scores and MEDAS score. However, while the literature focuses on burnout, sleep quality, physical activity, and diet quality of healthcare professionals during the COVID-19 pandemic, this study is among the few studies that evaluate the fatigue-insomnia relationship with MEDAS specifically.

The Mediterranean Diet, which is accepted as a healthy diet, focuses on the consumption of fish and other seafood, olive oil, vegetables and fruits, whole-grain foods, legumes, and oilseeds. This type of diet is a diet rich in fiber, unsaturated fatty acids, vitamins, and minerals and characterized by its resveratrol contents. With all these aspects, there is evidence about its positive effects on weight control, reduction of oxidative stress, and various diseases such as cancer and cardiovascular diseases (28-32). Various tools such as PREDIMED, KIDMED, and MEDAS are used to determine compliance with the Mediterranean diet. These scales give an idea related to the level of compliance to the

Mediterranean diet and their adherence to this diet type (26, 27, 33). According to the MEDAS scale used in this study, it is seen that the mean score of all healthcare professionals indicates a moderate (acceptable) level of compliance. The fact that the MEDAS median value differs only by gender suggests that women are more having information about this issue. Median MEDAS scores did not differ according to age, shift working, and working in any COVID-19 department in the hospital (Table 2).

In the study of Ataç et al. conducted with healthcare professionals, 10.8% of whom were physicians, it was determined that 52.3% had generalized anxiety disorder and 53.1% had insomnia (14). In the study, in which the rate of patients with both generalized anxiety disorder and insomnia was 36.9%, generalized anxiety disorder and insomnia were found to be common among healthcare professionals working at the forefront in the fight against the pandemic. In another study, it was observed that the state anxiety levels of healthcare professions were 50.5% and the severity of insomnia was 35.4% (34). In a study conducted with large participation (54231 participants from 13 countries), sleep disorders such as sleep interruption, falling asleep, sleeping late, and having nightmares were also reported. While the prevalence of sleep disorders is 32.3% in the general population, it has been reported to be 36% in healthcare professionals (35). Therefore, along with the pandemic, the frequency of situations such as insufficient or unbalanced nutrition, decreased sleep duration and deterioration of sleep quality, and working under intense physical and mental stress are increasing in healthcare professionals (36). As can be seen, there are studies to identify problems with anxiety, stress, and sleep in general during the pandemic process, together with healthcare professionals. In addition, due to lack of time not having rest and breaks between shifts during the pandemic process can cause fatigue and insomnia. In this study, insomnia and fatigue were moderate. However, while mean fatigue scores do not change according to the shift working and working in any unit related

to COVID-19; it is noteworthy that it is higher in females and in those aged >30 years (Table 2).

Dietary factors have a significant impact on physical and mental health, affecting the ability of healthcare professionals to cope with the challenges posed by the pandemic effectively (37-39). In addition, nutrition is known to play a significant impact in sleeping wellness (39). Evidence supports that diet is a mediating and modifiable factor concerning mental health and in terms of preventing such problems, it is important to have high compliance with the Mediterranean diet (37). In this study, when examining the relationship between fatigue-insomnia scores and MEDAS score, the crude and all models (adjusting age, gender, shift work status, and working in a COVID-19 service) showed no statistically significant results (Table 3). Although a study conducted in Türkiye during the pandemic found a negative relationship between the MEDAS score and depression ($t=-55.229$, $p<0.001$) and anxiety scores ($t=-39.078$, $p<0.001$), and a positive relationship between the MEDAS score and sleep quality (when adjusting gender, physical activity, income, and marital status) ($t=-50.365$, $p<0.001$) (Multiple linear regression results $R^2: 0.710$ $p<0.001$) (40). A study conducted with 567 healthcare professionals has shown that Adherence to the Mediterranean diet was linked to a reduced risk of depression [odds ratio 0.63, 95% CI (0.41, 0.96), $p = 0.033$] (41). On the other hand, in a study conducted in Türkiye, 91 emergency healthcare professionals' emotional exhaustion was associated with higher adherence to the Mediterranean diet (correlation coefficient 0.37, $p<0.01$) (42). In this study, there may be several reasons why there is no relationship between the MEDAS and insomnia-fatigue scores of healthcare professionals, including unmeasured confounders (like other eating habits and diet quality factors) and measurement errors. This is a pilot study, and further studies with more health centers and healthcare professionals are needed to address this gap in the literature.

Limitations of the Study: There are some limitations to the study. Firstly, the study was conducted in one hospital. The intense and long work hours of healthcare professionals during the COVID-19 pandemic were the factors that reduced participation. Secondly, this study was conducted with an online survey. However, this may be more advantageous for studies in such special situations rather than being a limitation. Thus, there is some evidence showing online surveys are more reliable or advantageous than face-to-face surveys (43). In addition, this study could not present the results of the food records of participants. This could have been more reliable for evaluating of nutritional status of health professionals. Lastly, the non-homogeneity of the occupational distribution, working status in a COVID-19 department, and shift working status of healthcare professionals are also likely to influence the results. The use of a convenience sampling method also limited the generalizability of the results.

Strengths of the Study

The period during which this study was conducted holds great significance both globally and particularly for healthcare workers. The data presented in this study regarding variables such as work-related stress, anxiety, and dietary patterns of healthcare professionals during this extraordinary time provide unique insights that cannot be observed under ordinary circumstances. Furthermore, the modeling approaches employed in this research offered valuable evidence on how increased insomnia and fatigue experienced by healthcare professionals in this specific period were reflected in their nutritional status. Finally, similar to other cross-sectional studies, although the causal inferences are limited, the study yielded associative findings.

CONCLUSION

It is thought that the changing lifestyle, worsening working conditions, as well as changes and irregularities in eating patterns because of the pandemic process, may be related to the low compliance of healthcare

professionals with the Mediterranean diet. The results of this study show that healthcare professionals' compliance with the Mediterranean diet was not high during the pandemic. However, no varied depending on the working a pandemic service or shift work compliance with the Mediterranean diet and insomnia-fatigue scores, and no relationship between MEDAS and insomnia-fatigue scores was not among the expected results of this study. This may be due to inaccurate statements made by the participants because of the participants not being able to spend enough time on the online survey form. Comprehensive studies should be conducted on this subject with more participants to clarify the issue.

Informed Consent: The study was conducted to the principles outlined in the Declaration of Helsinki. Participants were included in the study after they were informed, and their consent was obtained through an online questionnaire.

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Helsinki. Participants were included in the study after they were informed, and their consent was obtained through an online questionnaire.

REFERENCES

1. AbuRuz ME, Hayeah HMA. Insomnia induced by night shift work is associated with anxiety, depression, and fatigue, among critical care nurses. *Advanced Studies in Biology*. 2017;9(3):137-56.
2. Khade Y, Behera S, Koraddi S, Parvathi R. A Study on relationships amongst insomnia, fatigue, anxiety and depression in nurses. *Indian Journal of Physiology and Pharmacology*. 2019;63:246-51.
3. Owens JA. Sleep loss and fatigue in healthcare professionals. *The Journal of Perinatal & Neonatal Nursing*. 2007;21(2):92-100.
4. Irwin MR. Why sleep is important for health: a psychoneuroimmunology perspective. *Annual Review of Psychology*. 2015;66(1):143-72.
5. Bajraktarov S, Novotni A, Manusheva N, Nikovska DG, Miceva-Velickovska E, Zdraveska N, et al. Main effects of sleep disorders related to shift work—opportunities for preventive programs. *EPMA Journal*. 2011;2:365-70.
6. Zhang H, Wang J, Zhang S, Tong S, Hu J, Che Y, et al. Relationship between night shift and sleep problems, risk of metabolic abnormalities of nurses: a 2 years follow-up retrospective analysis in the National Nurse Health Study (NNHS). *International Archives of Occupational and Environmental Health*. 2023;96(10):1361-71.
7. da Silva FCT, Neto MLR. Psychiatric symptomatology associated with depression, anxiety, distress, and insomnia in health professionals working in patients affected by COVID-19: A systematic review with meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*. 2021;104:110057.

8. da Silva FCT, Neto MLR. Psychiatric disorders in health professionals during the COVID-19 pandemic: A systematic review with meta-analysis. *Journal of Psychiatric Research*. 2021;140:474-87.
9. Mahmud S, Hossain S, Muyeed A, Islam MM, Mohsin M. The global prevalence of depression, anxiety, stress, and, insomnia and its changes among health professionals during COVID-19 pandemic: A rapid systematic review and meta-analysis. *Heliyon*. 2021;7(7):e07393.
10. Zhang W-r, Wang K, Yin L, Zhao W-f, Xue Q, Peng M, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychotherapy and Psychosomatics*. 2020;89(4):242-50.
11. Sagherian K, Steege LM, Cobb SJ, Cho H. Insomnia, fatigue and psychosocial well-being during COVID-19 pandemic: A cross-sectional survey of hospital nursing staff in the United States. *Journal of Clinical Nursing*. 2023;32(15-16):5382-95.
12. Rodríguez-Pérez C, Molina-Montes E, Verardo V, Artacho R, García-Villanova B, Guerra-Hernández EJ, et al. Changes in dietary behaviours during the COVID-19 outbreak confinement in the Spanish COVIDiet study. *Nutrients*. 2020;12(6):1730.
13. Yılmaz C, Gökmen V. Neuroactive compounds in foods: Occurrence, mechanism and potential health effects. *Food Research International*. 2020;128:108744.
14. Ataç Ö, Sezerol MA, Taşçı Y, Hayran O. COVID-19 pandemisinde görev yapan sağlık çalışanlarında anksiyete belirtileri ve uykusuzluk. *Turkish Journal of Public Health*. 2020;18(COVID-19 Special):47-57.
15. Söğütü Y, Söğütü L, Göktaş SŞ. Relationship of COVID-19 pandemic with anxiety, anger, sleep and emotion regulation in healthcare professionals. *Journal of Contemporary Medicine*. 2021;11(1):41-9.
16. Doğan YN, Doğan İ, Kilic I. The Perception of health and the change in nutritional habits of healthcare professionals during the COVID-19 pandemic. *Progress in Nutrition*. 2021;23:12.
17. Yaman GB, Hocaoglu Ç. Examination of eating and nutritional habits in health care workers during the COVID-19 pandemic. *Nutrition*. 2023;105:111839.
18. Wang Q, Chu H, Li H, Li C, Li S, Fang H, et al. Deep neural network for prediction of diet quality among doctors and nurses in North China during the COVID-19 pandemic. *Frontiers in Public Health*. 2023;11:1196090.
19. Jin L, Zhang N, Zhu J. Healthy lifestyle changes and mental health of healthcare workers during the COVID-19 pandemic in China. *Current Psychology*. 2024;43(15):13953-62.
20. Çalışkan-Pala S, Metintaş S. Healthcare professionals in the COVID-19 pandemic. *ESTÜDAM Halk Sağlığı Dergisi*. 2020;5:156-68.
21. Sikalidis AK, Kelleher AH, Kristo AS. Mediterranean diet. *Encyclopedia*. 2021;1(2):371-87.
22. Boysan M, Güleç M, Besiroglu L, Kalafat T. Uykusuzluk Şiddeti İndeksi'nin Türk örneklemindeki psikometrik özellikleri. *Anadolu Psikiyatri Dergisi*. 2010;11(3):248.
23. Chalder T, Berelowitz G, Pawlikowska T, Watts L, Wessely S, Wright D, et al. Development of a Fatigue Scale. *Journal of Psychosomatic Research*. 1993;37(2):147-53.
24. Adın RM. Turkish adaptation of Chalder Fatigue Scale and investigating its psychometric properties in young adults: Hacettepe University; 2019.
25. Martínez-González MÁ, Corella D, Salas-Salvadó J, Ros E, Covas MI, Fiol M, et al. Cohort profile: design and methods of the PREDIMED study. *International Journal of Epidemiology*. 2012;41(2):377-85.
26. Schröder H, Fitó M, Estruch R, Martínez-González MA, Corella D, Salas-Salvadó J, et al. A short screener is valid for assessing Mediterranean diet adherence among older Spanish men and women. *The Journal of Nutrition*. 2011;141(6):1140-5.

27. Pehlivanoğlu EFÖ, Balcıoğlu H, Ünlüoğlu İ. Akdeniz diyeti bağlılık ölçeği'nin türkçe'ye uyarlanması geçerlilik ve güvenilirliği. *Osmangazi Tıp Dergisi*. 2020;42(2):160-4.
28. Dayı T, Erge S. Diyet Posasının ve Bağırsak Mikrobiyotasının Kolon Kanseri Riskine Etkileri. *Beslenme ve Diyet Dergisi*. 2020;48(1):91-7.
29. Górka P, Górka I, Przysławski J. Mediterranean diet and oxidative stress. *Nutrition & Food Science*. 2021;51(4):677-89.
30. Martínez-González MA, García-López M, Bes-Rastrollo M, Toledo E, Martínez-Lapiscina EH, Delgado-Rodríguez M, et al. Mediterranean diet and the incidence of cardiovascular disease: a Spanish cohort. *Nutrition, Metabolism And Cardiovascular Diseases*. 2011;21(4):237-44.
31. Shai I, Schwarzfuchs D, Henkin Y, Shahar DR, Witkow S, Greenberg I, et al. Weight loss with a low-carbohydrate, Mediterranean, or low-fat diet. *New England Journal of Medicine*. 2008;359(3):229-41.
32. Trichopoulou A, Bamia C, Trichopoulos D. Mediterranean diet and survival among patients with coronary heart disease in Greece. *Archives of Internal Medicine*. 2005;165(8):929-35.
33. Serra-Majem L, Ribas L, Ngo J, Ortega RM, García A, Pérez-Rodrigo C, et al. Food, youth and the Mediterranean diet in Spain. Development of KIDMED, Mediterranean Diet Quality Index in children and adolescents. *Public Health Nutrition*. 2004;7(7):931-5.
34. Abbas A, Al-Otaibi T, Gheith OA, Nagib AM, Farid MM, Walaa M. Sleep quality among healthcare workers during the COVID-19 pandemic and its impact on medical errors: Kuwait experience. *Turkish Thoracic Journal*. 2021;22(2):142.
35. Kocavska D, Blanken TF, Van Someren EJ, Rösler L. Sleep quality during the COVID-19 pandemic: not one size fits all. *Sleep Medicine*. 2020;76:86-8.
36. Turkish Medical Association. [Available from: <https://www.ttb.org.tr>.
37. Esquivel MK. Nutrition strategies for reducing risk of burnout among physicians and health care professionals. *American Journal of Lifestyle Medicine*. 2021;15(2):126-9.
38. Migdanis A, Tsolis K, Migdanis I, Kaltsa AG, Fytsilis FA, Manouras A, et al. The effect of shift working on dietary patterns of healthcare practitioners during the COVID-19 pandemic: A cross-sectional study. *Medicina*. 2024;60(4):627.
39. Zhao M, Tuo H, Wang S, Zhao L. The effects of dietary nutrition on sleep and sleep disorders. *Mediators of Inflammation*. 2020;2020(1):3142874.
40. Özcan BA, Yeşilkaya B, Yılmaz HÖ, Günel AM, Özdemir AA. Effects of adherence to the Mediterranean diet on depression, anxiety, and sleep quality during the Covid-19 pandemic in Turkey. *International Journal of Innovative Research and Reviews*. 2021;5(2):39-44.
41. Amiri S, Alajlouni O, Al-Rawi SO, Samra A, Jamil G, Kieu A, et al. Effect of Mediterranean diet and physical activity on healthcare professional depression, burnout and professional fulfillment during COVID-19. *International Journal of Occupational Safety and Ergonomics*. 2025;31(1):240-7.
42. Bakirhan H, Bakirhan YE, Yaşar G. Shift work, sleep, and burnout: The impact of Mediterranean dietary pattern and nutritional status on emergency healthcare workers. *Nutrition & Food Science*. 2023;53(2):402-15.
43. Vasantha Raju N, Harinarayana N, editors. Online survey tools: A case study of Google Forms. National conference on scientific, computational & information research trends in engineering, GSSS-IETW, Mysore; 2016.